SOME MATERIALS FOR THE STUDY

OF

AGRICULTURE and AGRICULTURISTS IN ANCIENT INDIA.

BY

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DEDICATED

TO

The Revered Memory

OF

SWAMI GNANANANDA

MY MASTER.



Preface.

Early in 1930, Prof. B M Barua, M. A., D Litt. of the Calcutta University suggested to me that I should undertake drawing up an account of "Agriculture and Agriculturists in Ancient India" The subject appealed to me and I took it up But, it presented difficulties partly because I am not a Sanskritist and partly because I was already in harness for scientific investigations. [1] Nevertheless, I began and progressed slowly and liesurely, and in less than a year, was able to collect an amount of material on which I thought, I could build up a structure sufficiently attractive to draw young investigators to this new line of research. Accordingly, I contributed a series of articles in local journals and newspapers,[2] out of which this book was finally worked out

None is more conscious than myself of imperfection in this work. The body of ancient Indian-literature is a store-house of human experience and wisdom gathered in course of ages. It is so vast, and the necessary materials are so

1. *Vide* The "Philosophical Magazine," London, vol V, March 1928, vol VII, February 1929, vol IX, January 1930, vol XI, February 1931, vol XIII 1932 and the "Nature," Edinburg, August 1930
2. *Vide* (i) Annals of the Bhandarkar Research Institute vol XII, part III
   (ii) The Indian Historical Quarterly, vol VI, part IV
   (iii) do do vol VII, part I
   (iv) The Calcutta Review, August 1930
   (v) The "Liberty" Sunday, June 21st

scattered that it is a tremendous task to do full justice to the subject so wide and important. I do not therefore, claim to have drawn a complete and finished portrait, but I do claim this to be the pioneer work, and hope that the materials that I have so far been able to lay my hand on, their systematic presentation, and the inferences that they have led me to draw, will form an interesting and attractive study

I have scrupulously tried to avoid hasty inferences and generalisations, and as far as possible, my remarks have been illustrated by full references to such evidences as I have found in the books and monographs Only in refuting the current theory of famine in ancient India, I have relied more upon an analysis of the determining factors of famine; and in dealing with farm-yard manure, I have advantageously tried to give an explanation of certain formulas in the light of modern sciences. The produce would however, have been poorer but for the keen interest of Prof Barua during the course of the work; and the publication of the book deferred had it not been for the letter of appreciation and encouragement that I received from Prof. M Eliade, M. A., Ph D, D Litt., of the University of Buchrest.

I am afraid, some bad-types and misprints have unavoidably crept in, and I sincerely apologise for the same.

Serampore College,
1 3 32

R. GANGULI.

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SOME MATERIALS FOR THE STUDY

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AGRICULTURE and AGRICULTURISTS IN ANCIENT INDIA.

CHAPTER I.

GENERAL INTRODUCTION :

Object of the book

The dawn of human civilisation is synchronous with the beginning of agriculture. Indeed, the plough and the lute seem to be the two symbols of cultural evolution of humanity the material and the æsthetic [1]

In days of yore, when the primitive half-savage nomad gave up his wandering habits and settled down, he settled down primarily as an agriculturist and made gradual progress towards civilisation. The original cradle of the Aryan is still an open question , and the theory of pre-indo-aryan origin of the word *Ārya* has now been discarded There is however, no doubt that *Ārya*

1 It is interesting to note that Balarāma and Krshna who according to the Hindu belief are the two protectors of the entire universe are represented as holding the plough and the lute respectively.

is the one word in the Ṛgveda that distinguished the agriculturists from the nomadic half-savage Dāsas and Dasyus who did not offer sacrifices to Indra pre-eminently the god of the agriculturist-aryans and were styled as 'non-sacrificing indifferent to the gods'[1] etc. That Dāsas and Dasyus were also of the aryan stock does not admit of any doubt [2] They were so called just to indicate their nomadic habits as opposed to the agricultural habits of the Aryans Thus, originally cultivation of the soil was the significant characteristic of the *Ārya*, and distinguished the civilised from the barbarians

In India therefore, the importance of agriculture was appreciated as early as the Ṛgvedic period when sacrifices were inaugurated in honour of Indra 'the wielder of the dreaded thunderbolt' the god who alone was believed capable of killing Vṛtra 'the demon of drought,' and thereby release the pent-up rains so vitally important for carrying on successfully agricultural operations. Since then, agriculture has ever been the chief industry of the country and as such, must have played not an insignificant part in the evolution of material culture in ancient India. Agriculture in ancient India is therefore, one of the most important branch of study and certainly

1. Rv VIII, 70, 11.
2 Macdonell and Keith observe that the very names of Dāsa leaders or chiefs appear to be aryan (Vedic Index I, p 357) and the significant verse in which Indra says "I have deprived the Dasyus of their appelation of ārya" (Rv X, 49, 3) unmistakably shows as Dr Das has pointed out (see Rgvedic Culture, p 157) that the Dasyus also belonged to the aryan stock

demands more interest than has hitherto been accorded to it. To our knowledge, no serious attempt has so far been made to prepare a systematic study on the subject. Some previous publications on ancient India include references to agriculture, but they are too scrapy and meagre to form a presentable account of the subject as a whole. In the following pages therefore, an attempt has been made to collect all available materials and present them in a way so as to form a systematic, connected and critical study.

Sources of information

Sources of information have been mainly the ancient Indian literature, some foreign writers and a few monumental remains.

The earliest literary source is the Ṛgveda in which we find numerous prayers for agriculture, invocation of the Divine for timely rains, irrigational methods and solicitude for the safe-keeping and well-being of cattle. We find also that *Sakṛt*[1] (dung) was used for manuring the field, the land was ploughed and when the 'womb' was ready, seeds were sown. When the corns were ripe, they were cut down with *Sṛṇi*, threshed, winnowed and garnered.[2] In the Yayurveda, we find distinct reference to the rotation of crops, of *pavira*[3] the metal plough, and of wheat, sesame, mudga, māsha and other crops which were apparently unknown in the time of the

1. See Vedic Index II, p 348
2. Vedic Index. I, p 182.
3. Tait Sam IV, 2, 5, 6, , Vāj Saṃ XII, 71.

Rgveda thus signifying a progress. The Atharva-veda mentions animal enemies of corn the locust, the rat, the bar etc, contains excorcism of these vermins, charm for procuring increase of grain and many other references to agriculture.

The Ayodyā-kānda and the Bāla-kānda of the Rāmāyana and the Sabhā and the Śāntiparvas of the Mahābhārata give us many valuable informations regarding agriculture in the epic period. The Jātakas supply materials for drawing a graphic picture of the life of the ancient agriculturist with his joys, sorrows, customs, beliefs etc ; while the Law-books provide us with laws regarding the agricultural land and also those that regulated the agricultural industry in early days

By the time the Kautilya Arthaśāstra was composed, agriculture became an important department of the government under the charge of a special officer well-versed on the subject, and attained a stage of perfection astonishing for that age. The Arthaśāstra, though essentially a treatise on royal polity and art of government, deals with agriculture under an important sub-head of *Krsi-tantra*. The Brhat Samhitā, and of the Purānas, the Agnipurāna particularly, incidentally deal with plant physiology, selection of soil, manuring, cultivation under favourable meteorological conditions, collection and treatment of seeds, sowing, planting, cutting, grafting, nursing and reaping. Much of the art of cultivation as it existed in ancient days can also

be gleaned from a hand book written by Parāsara bearing the title of *Kṛṣi-samgraha*. This small treatise supplemented with Khanā's maxims, throws a flood of light on the perfection attained in the art of agriculture in ancient India.

Of foreign writings, the Indica of Megasthenes and the Periplus have been found to be by far the most important. The former largely corroborates the inferences drawn from the materials obtained from the Arthaśāstra, while the latter supplies valuable informations regarding export trade in agricultural produce

Monumental remains that have been taken advantage of are particularly the Sudarsana-Lake, the Sohgaura copper-plate inscription and Asoka's pillar-edicts IV and V.

Difficulties of preparing a satisfactory account

To prepare a satisfactory account of the subject is however, difficult difficult on account of obstacles that arise mainly from the paucity of materials and vastness of the field of investigation That the village and the condition of the peasantry were not perhaps exactly similar in all parts of the country must be taken into consideration The inferences again, drawn from the references obtained from any one book say, the Ṛgveda, are not applicable to the whole of India It may be claimed however, that the materials that have been collected give as a whole, a moderate estimate of the subject in relation to the whole of India as one geographical unit.

Just a general study of the subject in relation to the whole India as one geographical unit

The type of civilisation of India and the fact that she is surrounded by seas and mountains point unmistakably to her being a geographical unit and as such she stands from a remote age of the past. From geological evidences however, we learn that originally, a sea extending from end to end across India entirely separated the Punjab and the Himalayas from southern India. At a later geological age, a portion of this sea disappeared by an upheaval partly volcanic and partly siesmic This upheaval probably caused also a depression of the Ārāvallı range thus making it possible for the Aryans to migrate southward. In course of ages, alluvial soil washed down to the gangetic sea, filled up the trough and new lands began to form and merge out. Bengal plain was the last to be reformed out of the sea, which partly explains the richness of her soil and her efficiency in the production of rice and jute

In the Ṛgveda, we find a clear reference to the Rajputānā sea, for verse VII, 95, 2, distinctly states that the Saraswati flowed right into the sea ; and the existence of the Gangetic sea is perhaps indicated by the word '*Pūrva Samudra*" in verse X, 136, 5 True in an early geological period, a different distribution of land and water existed in India, but whether or not it existed at the time of the Ṛgveda seems just a matter of speculation ; for, the internal evidence of the

Ṛgveda that we have mentioned above, may be only a recorded tradition. The Matsya Purāna also in Chapter CXIV, and the Agnipurāna in Chapter CIX, speak of the union of the Saraswati with the sea. This simply shows that in India, a tradition or another has been carried through ages and as such, it defies any mathematical computation as to exactly when it arose. The age of the Ṛgveda is still an open question. The arguements in favour of this statement cannot be given here as they will be guilty of being out of place. Only attention may be drawn to the ancient finds at Harappā and Mahenjoderro ; and it may be safely noted that India has been habitable from time immemorial.

The Ṛgveda however, does not mention the Deccan or any of the provinces lying to the east of the Punjab except only Kikata. It mentions the Gangā and the Jamunā, and gives the tributaries of the Indus in strict geographical order. The Yayurveda introduces us to a different geographical area in the middle of Northern India called the Kuru-Pānchāla country (Thaneswar and Rohilkhand) The Satapatha Brāhmana relates the migration of the Aryans to Videha (Tirhut), while by the time of the Atharvaveda, the Aryans seem to have known the whole country from Gāndhāra in the N. W. to Anga and Magadha in the East. The Aitareya Āranyaka appears to have a reference to Bengal. In the Brāhmana-period, the colonisation of Southern India and Ceylone also, was completed

by the Aryans. The Vatthugāthā of the Pārāyanavagga of the Sutta Nipata mentions a route from Asmaka in the Deccan to Vaisāli (modern Besarh in Tirhut) right across the Vindhyas; and the Aitareya Brāhmana mentions Vaidharvas, Andhras, Pundras, Sabaras, Pulindas and Mutibas

will bear reproduction here:

"After a Vaisya has received the sacraments and has taken a wife, he shall be always attentive to the business whereby he may subsist and to that of tending cattle. For when the Lord of creatures (Prajāpati) created cattle, he made them over to the Vaisya; to the Brāhmana and to the king, He entrusted all created beings A Vaisya must never conceive the wish 'I shall not keep cattle'; and if a Vaisya is willing to keep them, they must never be kept by men of other castes A Vaisya must know the respective value of gems and of pearls, of coral, of metals, of cloth, of perfumes and condiments. *He must be acquainted with the manner of sowing seeds and of the good and bad qualities of fields* and he must perfectly know all measures and weights; moreover, the excellence and defects of commodities, the probable profit and loss on merchandise, the advantages of different countries and the means of properly rearing cattle. He must be acquainted with the proper wages of servants, with the various languages of men, with the manner of keeping goods and the rules of purchase and sale. Let him exert himself to the utmost in order to increase his property in a righteous manner and let him zealously give food to all created beings."[1]

Considering the importance attached to agriculture as the staple industry of the country,

1 Manu, IX, 326 333 See also Hārita, II, 16, Parāsara, I, 60; Samkha I, 4, Atri, 368, etc.

there can be no reason to doubt that Vaiśyas were particularly agriculturists, and as such their agricultural land-holding was certainly a professional occupation. Most probably, in the time of Manu and subsequently also, agricultural land was entirely in the hands of agriculturists. If, for the sake of argument, it is supposed that non-agriculturists still held land, it must also be substantiated that they managed to get their fields cultivated by mutual contract with cultivators; for, all land must be cultivated, or there would be a loss in the king's revenue. Moreover, the law provided that when the owner was unable to cultivate his land himself, he should lose the right to have any interest thereof, and a stranger who might undertake its cultivation unchecked would be allowed to keep the produce. This law held also if the owner was dead or gone no one knows whither.[1] Again, in the Nārada Smṛti we find, "When the owner returns while the stranger is engaged in cultivating the field, the owner shall recover the field after having paid to the cultivator the whole expense incurred in tilling the waste. Where the owner is unable to pay for the expenses, a deduction of an eighth part shall be made till seven years have elapsed. But when the eighth year arrives, the owner shall recover the field cultivated by the other as his independent property."[2] Thus a land-owning non-agriculturist,

1. See Nār XI, 23 Also the Agni-Pur., Chap CCLVII. and also the Arthaśāstra, BK. II, ch 1
2. XI, 24, 25 See also the Arthaśāstra. Bk. III, ch 10

if there was any, was practically in the grip of the cultivator, for if he failed to cultivate his land for even a year, it would be considered a half-waste ;[1] and a cultivator who tills the waste the year after, must be paid the whole expense incurred thereby before the owner could have any right to get an interest on his land in the form of a share in the crop It should be noted also, that in the days of Gautama, "The cultivators had their own corporations or unions."[2] In the days that followed, these factors must have operated greatly not only to restrict transference of land to non-agriculturists but also to discourage non-professional land-holding

Nothing to show that cultivation of land by fragmentation was carried to an excess

Litigation on land was discouraged, and boundary disputes whenever there arose, were settled by an arbitration board[3] except in cases where no local person conversant with the true state of things could be found. In such cases only, the king himself fixed the boundary.[4] Decision usually rested with the neighbours, the inhabitants of the same village or town, the

1 See Nār , XI, 26 "A tract of land which has not been under cultivation for a year is called *Ardha khila* (half waste), That which has not been under cultivation for three years is called *khila* (waste) and that which has not been under cultivation for five years is no better than a forest "

2. Gautama, XI 20 21 See also the Arthaśāstra, BK III, ch. 14.

3 See Nār , XI, 9 and also the Arthaśāstra, Bk III, ch 9.

4 *Ibid*, XI, 11. See also Manu, VIII, 265 Yāgñ , II, 153

other members of the same community and the seniors.[1] This prevented drainage of a considerable portion of agriculturists' money through law-courts, which could be invested as an agricultural capital and thus profitably employed on land. Not only that, the interest on land from the standpoint of agriculture was further safeguarded by rules on debt and usury. Usury in general, was condemned, so much so that the food of an usurer was forbidden to be taken [2] Only a Vaisya was at liberty to get over a period of distress by practising usury [3] The rate of interest was usually 80th part of a hundred in every month.[4] In cases where land was mortgaged, the debtor delivered the field to the creditor with this stipulation that "the mortgager should recover his pledge as soon as the creditor had fully realised his demand out of the mortgage, no matter whether he (the mortgager) contributed anything himself towards the realisation" [5] Agriculture, tending of cattle, trade and banking were the lawful occupations of Vaisyas, and they were particularly agriculturists. So, permitting them only to lend money on interest checked the land going out of the hands of the agriculturist class. The above law as laid down by Bṛhaspati clearly helped also to safeguard the position of the small peasant-proprietor ; and

1 *Ibida*, XI, 2 Also Manu, VIII, 256, Yāgñ , II, 153.
2. Manu, IV, 210 and 220
3 Nār , I, 111
4 Manu VIII, 140 , Nār , I, 99 , Vasistha, II, 51.
5 Brhaspati, XI, 24

if the land at all went out of his hands, it went to the bigger and wealthier neighbour-agriculturist with the result that there was a tendency to consolidation of agricultural land rather than its fragmentation. This also explains the fact that the absence of farming on a large scale which is so characteristic a feature of the present day was not perhaps strikingly so in ancient times. This inference which the above facts naturally force upon us can also be corroborted by references in the books [1] to a farmer possessing as many as five hundred ploughs and working a farm of thousand *Karīsas* or eight thousand acres.

It has been admitted on all hands that cultivation by fragmentation is a greater evil than fragmentation of land by sub-division of holdings. Small holdings there were, but there is nothing to show that cultivation of land by fragmentation was carried to an excess. On the other hand, we find books speaking of partnership concerns in cultivation and also codifying laws to regulate such concerns. Brhaspati says, "Tillage should be undertaken by a sensible man jointly with those who are his equals in points of cattle, workmen, seeds and the like as well as implements of husbandry. When by the deficiency of one partner as to cattle or seeds, a loss happens to the produce of the field, it must be made good by him to all the husband-men" [2] Jātaka No. 67

1 Brāhmin Bharadwāja is represented as having 500 ploughs See also Jāt No 218 For a farm of 1,000 *Karisas*, see Jāt No. 389

2. XIV, 21 and 25. See also Yāgñ. II, 262 268

speaks of two brothers-in-law cultivating together and we find Khanā enjoining that, "for the interest of cultivation father and son, failing which brother and brother should join hands" [1] Indeed, joint-family system was another very important institution from economic standpoint. No member of a joint-family needed insuring his life in an Insurance Co. with a view to making provision for his wife and children ; for, he know that after his death, his wife and children would be maintained equally honourably as during his life-time by his surviving brothers in return of the services that he had rendered to the family while he was alive. The village money-lender provided banking facilities ; and debts whenever there was any necessity to run into them, were incurred on the joint responsibility of all the able-bodied members of the family. The savings of the members like wise went to the joint fund, and whenever required, the fund was employed to help one member or another according as he needed help, or in buying a property in which all the male members would have an equal share, no matter how much different the contribution of the individual member to the family fund might have been.

True, Gautama, Baudhāyana and Āpastamba[2] say that if the property were divided, the land was equally divided amongst the sons. But Manu while discussing the question of inheritance does

1 *Vide* Gupta Press Pañjikā,

2, See Gaut., XVII, 5-17 , Baudh II, 2, 3, , Āp . II, 6, 14.

not mention land at all. Probably, thereby he meant to discourage sub-division of holdings. Nevertheless, it cannot be denied that the Hindu laws of inheritance have a tendency to effect sub-division of holdings. But excessive sub-division was prevented if we suppose that in many cases, the property could advantageously be held jointly by all the sons instead of dividing it, while one son farmed it and shared the crops with the other owners. In such cases, where the field was made over to another on a special contract, law said that the owner of the seed and the owner of the land were both considered as sharers of the crop.[1] This would be possible if only alternative occupations were available to the other sons We know that agriculture was only one of the lawful occupations of Vaisyas Tending of cattle, trade and money-lending were also open to them, and the other sons could profitably take to one or another of those occupations and thereby supplement the income of the family. There was thus nothing serious in the way of joint-family ownership of land and a consequent beneficial check to an excessive subdivision of holdings with its attending vices.

1 See Manu, IX, 53.

CHAPTER III.

THE AGRICULTURAL MODE IN ANCIENT INDIA.



Importance attached to agriculture in ancient India

In olden days as now, agriculture was the chief industry of the people of India. The many references throughout the whole body of ancient literature clearly show how great an importance had always been attached to it in ancient days. In the very earliest extant literature, we find people making sacrifices in honour of Indra with a view to strengthen him to fight against Vṛtra who was believed to shut up rains in his dark cloud body. They realised that rainfall was essential for agriculture and believed that the God India was the only god who could kill Vṛtra and thereby release the captive waters and thus give timely rains so important for successful agricultural operations. The very fact that Indra was raised to the supreme position in supersession of Varuna the highest god of earlier days and that the greatest number of verses were dedicated to him, point out the great solicitude for agriculture in those days

In the law-books, there are numerous practical rules for agriculture, some of which have

already been given. It was one of the regal duties to see that agriculture was being carried on properly, to construct roads for traffic both by land and water, set up market towns and offer facilities for cattle breeding and commerce [1] The same inference is drawn from the Sabhāparva of the Mahābhārata, where the great sage Nārada is represented as asking Yudhisthira whether the four items of *Vārta* agriculture, trade, cattle-rearing and banking were carried in his kingdom by honest men, as upon these depended the happiness of his subjects; and whether the five wise and greatmen employed in the five chief posts namely that for protecting the agriculturists, the merchants, the city, the forts and that for punishing the criminals were doing good to his kingdom by working in unison [2] The Arthaśāstra also mentions a government officer whose exclusive duty was to supervise agriculture. Megasthenes stands for the statement that husbandmen were regarded as a class sacred and inviolable.[3] In the Sāntiparva of the Mahābhārata, Bhisma advises the king so that the agriculturists in his kingdom might not leave it through oppression;[4] and also, persons engaged in the tending of cattle, trade and similar other business might not suffer injury.[5] In the

1 See the Arthaśāstra. Bk. I., ch. 19.
2 See chapter V 79, 80.
3. Mc Crindle, P 32.
4. Chapter LXXXIX, 24.
Cf. "दण्डविष्टि कारावाधैः रक्षेदुपहतां क्षपिम्।"
(See the Arthaśāstra Bk I ch 19.)
5. Chapter LXXXVIII. 27 & 28. See also the Agnipurāna ch. CCXXIII.

Sabhāparva again and also in the Arthaśāstra, we find references to the king giving a loan of seed grains, cattle and money to needy agriculturists.[1] In the Ayodhyākānda of the Rāmāyana, the king is represented as boasting of his kingdom as abounding in corn.[2] In both the Epics, we find that the king was required to understand three kinds of learning; *viz.* the Vedas, agriculture and commerce. The fact that Janaka the King of Mithila is represented as personally ploughing [3] is also very significant.

Farming operations

Prithu the son of Vena is credited as being the first to bring the Earth under cultivation.[4] This legend may mean only that Prithu introduced improved methods of cultivation; for, the earliest description of agricultural operations is found in the Rgveda [5]

1 See the Sabhāparva, LI, 3, and the Arthaśāstra, Bk. I, ch. 19.

2. Chapter III, 14.

3. See the Bālakānda of the Rāmāyana, LXVI.

4. See the Atharvaveda VIII, 10, 24 and also the Vishnupurāna Bk XIII, 82, 83.

5 "Fasten the ploughs, spread out the yokes and sow the seed on the field which has been prepared Let the corn grow with our hymns Let the scythe fall on the neighbouring fields where the corn is ripe." "The ploughs have been fastened, the labourers have spread the yokes, the wise men are uttering prayers to Gods"

"Refresh the horses, take up the corns stacked in the fields and make a cart which will convey it easily This well full of water for the drinking of animals is one *drona* in extent and there is a stone wheel to it And the reservior for the drinking of men is one *skanda* Fill it with water."

(Rv. X, 101, 3, 4, 7).

In the Satapatha Brāhmana, the operations of agriculture are neatly summed up as ploughing, sowing, reaping and threshing. When the corns were ripe, they were cut with Sṛni, bound into bundles and threshed out on the floor of the grannery. The grain was separated from the straw by a winnowing fan called *dhānyakṛt*, then measured in a vessel called *ūrdara* after which they were stored in *shvis*.[1] In the Kullavāgga, Mahānama the Sakyan while telling Aniruddha what is incident to house-hold life gives a short list of farming operations [2] A similar but shorter list is given in Jāt. No. 76 also.

Other books have supplied informations sufficient to draw a detailed and scientific account of the agricultural mode in ancient India ; and we propose to give the account under the following heads :

1. Soil and its classification.

1. See Vedic Index, I, p 182

2 "First you have to get your fields ploughed. When that is done, you have to get them sown. When that is done, you have to get the water led down over them. When that is done, you have to get the water let off again. When that is done, you have to get the weeds pulled up. When that is done, you have to get crops reaped When that is done, you have to get the crop carried away. When that is done, you have to get it arranged in bundles , when that is done, you have to get it trodden out When that is done, you have to get the straw picked out. When that is done, you have to get all the chaff removed. When that is done, you have to get it winnowed. When that is done, you have to get the harvest garnered. When that is done, you have to do just the same the next year and the same all over again the year after."

(The Kullavāgga VII, 1, 2).

2. Meteorological observations leading to forecasting of rainfall.
3. Irrigation
4. Preparation and application of manure.
5. Collection and treatment of seeds.
6. The construction of agricultural implements
7. Ploughing the land.
8. Sowing, planting, treatment of plants etc.
9. Reaping and storing.
10. Rotation of crops.
11. Protection of crops.
12. Agricultural labour.

Soil and its Classification

CLASSIFICATION

According to fertility, soil is mainly divided into two classes ; *Urvarā* (fertile) and *Anūrvarā* or *Usarā* (sterile). *Urvarā mṛttikā* is again subdivided into different kinds according to their peculiar fitness for the cultivation of different kinds of crops ; for instance, *Yavya, tila, vraiheyaśāleya, maudgīna* i.e., the soil fit for barley, for sesamum, *vrīhi* (rice), mungo etc. *Anūrvarā mṛttikā* is also sub-divided into *ūsara* (salt ground) and *maru* (desert). The soil watered by river and that watered by rain are respectively called *nadī-mātṛkā* and *deva-matṛkā.*

SELECTION

The exact chemical composition of different kinds of soil might not have been known to the ancient authors but from the following typical

maximums [1] of Khanā, it becomes clear that they made extensive experimental observations about them and obtained a masterly knowledge regarding their characteristic suitability for the cultivation of different kinds of crops.

"Sandy soil is suitable for the cultivation of *Āus* paddy and clayey soil for that of jute"

"Your expectation will be fulfilled if you cultivate *patol* (Trichosanthes dioica) in sandy alluvial soil."

"Potato thrives well, if cultivated by the side of a bamboo-grove."

"If arum is sown on the bank of a river, it grows three cabits long"

In the Arthaśāstra, we find an enumeration of the suitability of different lands for the cultivation of different crops

"Lands that are beaten by foam, i e, banks of rivers etc. are suitable for growing Vallīphala (pumpkin, gourd and the like); lands that are frequently overflown with water (parivāhāntā) for long pepper, grapes (mrdvīka) and sugarcane; the vicinity of wells for vegetables and roots; low grounds (haraniparyanta moist bed of lakes, *com*) for green crops, and; marginal furrows between any two rows of crops are suitable for the plantation of fragrant plants, medicinal herbs, khuskhus roots (ūśira), hira (?), beraka (?) and pindālaka (lac) and the like" [2] Medicinal herbs were also grown in pots (व्याख्या)

1. Vide Gupta Press Panjikā
2 Arthaśāstra, English translation by Dr. Shamasastry, p. 198.

INDISPENSIBILITY OF WATER

That water is essential for germination, that the soil must be sufficiently moist and the moisture maintained until the plant is established is fully recognised in the following verse from the Kṛsi-samgraha.[1]

"वृष्टिमूला कृषिः सर्व्वा कृषिमूलञ्च जीवनम्।
तस्मादादौ प्रयत्नेन वृष्टिज्ञान समाचरेत्॥"

"Rain is essential for cultivation and the latter is essential for life, so one should first acquire carefully the knowledge about rain-fall."

Meteorological Observations leading to Forecasting of Rain-fall

Parāśara in his Krsi-samgraha deals elaborately with meteorological observations leading to predictions about rain-fall or scarcity of water and consequent abundance or dearth of crops. The following quotations will bear proof.

INFLUENCE OF THE PLANETS ETC.

"If the Sun be the ruler of the year (वर्षाधिप), the rain-fall is moderate. If the year comes under the influence of the Mars, the rain-fall is scanty, and it is abundant if the year comes under the influence of the Moon, the Mercury, the Jupiter and the Venus. If the Saturn rules over the year, there will be drought and the earth will be full of dust." 13, 14.

1. Krsi samgraha (Bangabashi Edition) All the verses from Krsi-samgraha are translated for the first time by the author.

"The earth is partially drenched under the influence of *Āvarta*, [1] and wholly drenched under the influence of *Saṃvarta*. Under *Puskara*, the rain-fall is scanty and under *Droṇa* it rains in abundance. 24-26.

"If the moon enters Gemini, Aris, Taurus or Pisces or the Sun enters Cancer, there will be 100 *ādhaks* [2] of rain ; there will be 50 *ādhaks* of rain when the Sun enters Leo or Sargittarius, 80 *ādhaks* when it enters Virgo or Capricorn, and 96 *ādhaks* when it enters Cancer, Aquarius, Scorpion and Libra." 28, 29.

"Of this 50% will fall on oceans, 30% on mountains and 23% on land." 30.

"Rain-fall is sure during the transit of the Mars and the Saturn from one zodiac to another and the Earth is fed with heavy showers just before the transit of the Jupiter." 69.

"If the Jupiter enters the asterism known as *Citrā*, clouds burst out in the same way as water bursts out from a broken pitcher , but if the Jupiter enters *Svāti*, it does not rain at all in spite of thickest clouds." 70, 71.

MONTHLY INDICATIONS ·

"Heavy showers will fall on the earth if the sky is cloudy and lightening flashes in the

1. Āvarta, Samvarta, Puskaro and Drona are the four types into which clouds are divided
2. Aḍhak is a unit of measure in Astronomy It is equal to 100 *yojanas* square and 30 *yojanas* high (1 *yojana* = about 7 miles)

western sky during the bright half of the moon (सितेपचे) in the month of *Paus.*" 35.

"If any day in the month of *Paus* becomes rainy or foggy, seven months hence, it must rain cats and dogs in the corresponding day." 36.

"The year in which clouds are seen or rain falls on the seventh day of the full-moon in the month of *Māgh*, is a blessed one and yields plenty of crops" 37.

"If on the seventh day of the new-moon in the month of *Māgh*, it rains under the influence of *Svāti* or strong winds blow or rain-laden clouds roar in the day-time or the sky becomes covered with lightening flashes and the moon and the stars become enveloped, then there will be an excellent rain-fall up to the month of *Kārtik.*" 38.

"If the seventh day of the full-moon in the month of *Māgh*, or *Fālgun* or the third day of the full-moon in the month of *Caitra* or the first day of *Vaiśākh* be a day of thunder-storm and rain, then in that year, there will be no scarcity of rain and the earth will yield crops in abundance" 39, 40.

"If it rains any day in the month of *Agrahāyan* or *Māgh* or *Fālgun*, then, in the seventh month from that day, the earth will receive a heavy shower" 41.

"If the first day of the full-moon in the month of *Caitra* falls on a Sunday, then there will be a moderate rain-fall; and if it falls on Monday, the earth will be flooded But if it is a Tuesday, it will be a year of drought and dearth. If it is

Wednesday, Thursday or Friday, the earth will be full of corns and if Saturday, even the sea gets dried up and the earth becomes dry and dusty." 42, 43.

"There will be a moderate rain-fall during the year, if it rains under the auspices of *Citrā* in the first half of the month of *Caitra*, and a heavy rain-fall if it rains in the middle or the latter part of the month." 44.

"If under the auspices of the asterisms *Svāti*, *Citrā* and *Viśākhā*, the sky be cloudless in the month of *Jyaistha* or it rains in the month of *Śrāvan*, then there will be a pretty good rain-fall that year." 55.

"Rain-fall will be good throughout the year, if it rains on the 9th day of the full-moon of *Āsādh*. If otherwise, there is no prospect of rain that year." 57.

"In the year in which it does not rain under the auspices of *Rohinī* in the month of *Śrāvan*, people will be in distress and cultivation a failure." 60, 61.

In the following verses Parāśara gives *another method* of predicting the rain-fall for the year.

प्रवाहयुक्तानद्यन्तु दण्डं न्यस्य जले निशि।
वैशाखशुक्लप्रतिपत्तिथौ वृष्टिं निरूपयेत् ॥ ४५
ओं सिद्धिरिति मन्त्रेण मन्त्रयित्वा शतत्रयम्।
अङ्कयित्वा तु तं दण्डमङ्गुष्ठे जले क्षिपेत् ॥ ४६
प्रातरुत्थाय सहसा तदङ्कन्तु निरूपयेत्।
समं चैवाधिकं न्यूनं भविष्यज्जलकांक्षया ॥ ४७

गतवत्सरद्वारि वन्या चैव समे भवेत्।
हीने हीनं भवेद्वारि भवेदुवन्या च तादृशी ॥ ४८
अङ्गाधिक्ये च द्विगुना वृष्टिर्वन्या च जायते।
एवं पराशरेणोक्तं भविष्यवृष्टिलक्षणम् ॥ ४९ [1]

He directs to take a rod and write a mantra on it two hundred times on the first night of the full-moon in the month of *Vaiśākha* and then erect it on the bed of a flowing river and mark where the water level stands If the water level is found not to have changed the following morning, then the rain-fall will be the same as in the previous year. The rain-fall will be more or less than that of the previous year according as the water-level goes above the mark or below it. 45-49

PREDICTION FROM WIND DIRECTIONS

That the ancient people could forecast weather conditions from the *direction of the wind* may be guessed from the following verse :

दृष्ट्वा दण्डे पताकान्तु वातस्यानुक्रमेण च।
विद्येया मासिकी वृष्टिर्दृष्ट्वा वातं दिवानिशम्॥ ३४ [2]

Parāśara [3] says, "The rain-fall will be good if in the month of *Pauṣ* wind blows from the North or from the West ; and the rain-fall will be scanty if the wind blows from the East or the South. It does not rain at all, in the case of the wind blowing unidirectionally and strongly." 32.

"It rains well if on the full-moon day of *Āṣādh*, wind blows towards the East. It means

1, 2 & 3 *Vide* Krsi samgraha

damage to crops if it blows towards the South-east, scanty rain-fall if it blows towards the South and destruction of crops if it blows towards the South-west. A westerly wind means rain-fall and a north-westerly, storms. If the wind is northerly or north-easterly, it forebodes abundant harvest." 56.

PREDICTION OF IMMEDIATE RAIN-FALL OR SCARCITY

As for the prediction of immediate rain-fall, Parāśara [1] gives the following :

"There will be an immediate rain-fall, if water-spouts are seen at or near water, or if ants suddenly line upwards after collecting their food, or if frogs croak suddenly." 63, 64.

"If cats, weasels, snakes and other creatures that live in holes and pits, and *Śarabhas* (a kind of deer) run excited, or if boys build clay bridge-ways in the middle of a path, or if peacocks go on dancing, then rain must be falling immediately." 65, 66.

"Clouds will be presently pouring down, if sudden pain arises in the body of a sprained or rheumatic man, or if snakes climb to the top of trees, or if water-birds dry their wings in the sun, or if buzzing sounds are heard in the sky." 67, 68.

Signs of drought are given in the following passages of the Kṛṣi-saṃgraha.

"ध्रुवे च वैष्णवे हस्ते मूले शक्रे चरन् कुजः ।
सद्यः करीन्धनाल्पृष्टिं कृत्तिकासु मघासु च ॥ ७३

1. *Vide* Kṛṣi-saṃgraha.

कुजपृष्ठगतो भानुः समुद्रमपि शोषयेत् ।
सद्यो निक्कृन्तयेद्दृष्टिं चित्रामध्यगतोः भृगुः ॥ ७४
अङ्गारको यदा सिंहे तदाङ्गारमयो महो ।
स एव रविणा युक्तः समुद्रमपि शोषयेत् ॥"

"There will be drought if the Mars goes into *Uttarafalgunī*, *Uttarāsādhā*, *Uttarabhādrapada*, *Śravanā*, *Hastā*, *Mūlā*, *Jyesthā*, *Krttikā* or *Maghā*. Even the sea is dried up if the Moon closely follows the Mars, and drought is impending if the Venus enters *Citrā*. The Earth becomes scorched up (for want of rains) if the Mars goes into Leo and the ocean becomes dry if it is in conjunction with the Moon." 73, 75.

In the Arthaśāstra also we find that "A forecast of such rain-fall can be made by observing the position, motion and pregnancy (*garbhādhāna*) of Jupiter (Brhaspati), the rise, setting and motion of Venus and the natural and unnatural aspect of the Sun." [1]

KHANĀ'S MAXIMS

Some of the asphorisms of Khanā as to rain-fall and scarcity of rain and their influence on harvest are given below :

"Rainy day and cloudly night predict a drought and warm *Paus* and cold *Vaiśākh* predict a heavy downpour in *Āsādh*."

"It rains cats and dogs, if stars are seen within the moon's halo. The bigger the corona of the moon, the nearer is the rain-fall."

1. *Loc. cit.*, p 139.

"Rainbow in the western sky (i e in the morning) predicts scarcity of rain, while that in the eastern sky (i.e. in the afternoon) means a heavy shower."

"If it rains in the month of *Agrahāyanā*, even the king is driven to begging ; and if it rains in *Paus*, even the husks are sold high."

"If it rains towards the end of *Māgh*, glory be to the king and holy is the land, and if in *Phālgun*, *cinā* and *kāon* (grains) grow in plenty."

"Drought in *Jyaistha* and showers in *Āsādh* lead to crops too abundant for the earth to bear."

"If it rains in *Āsādh*, paddy grows in plenty."

"There will be an abundant harvest if it rains in the month of *Caitra*."

"*Āus* paddy doubly grows, if it rains in the beginning of *Vaiśākh*."

"Khanā says to the cultivator that if fleecy clouds be followed by wind in the full-moon day of the month of *Kārtik*, winter crops grow plentifully ; but if there be cloud and rain in the night, it is fruitless to go to the field (i.e. to expect any harvest)."

"The year in which it rains in the 9th day of the full-moon in the month of *Āsādh*, the heron will walk over the very bed of the sea. If it drizzles on that day, it will be followed by heavy showers throughout the year to the extent of making fish inhabit the top of mountains (i. e., the earth will be flooded) If it rains now and then, there will be a rich harvest and if the

Sun sets under a clear cloudless horizon, the crops will not grow at all."

One third of the requisite quantity of rain-falls both during the commencement and closing months of the rainy season and two-thirds in the middle are considered very even; and good havest is certain, when rain free from wind and unmingled with sunshine falls so as to render three turns of ploughing possible.[1]

Irrigation

REFERENCES IN THE VEDAS

From earliest times, irrigation has always played an important part in the agricultural industry of India In the Ṛgveda, we find many references to irrigation The word "well" frequently occurs there [2] and is described as "unfailing and full of water" [3] Water was raised from it by means of a wheel, a strap and water pails,[4] and also perhaps by buckets tied by rope to one end of a long wooden pole, working about a fulcrum near the other end that carried a heavy weight The same old crude method is still found in some parts of Northern India Another method largely employed is to raise water by a small canoe tied by four strings two at each side and worked between two men standing on a

1. See the Arthaśāstra, Bk II, ch 24
2. *Vide ante*
3. Rv X, 101, 6.
4. See Rv. VIII, 69, 12. Also Jāt. Nos. 174 and 259.

wooden platform projecting over a shallow reservior. The canoe is swung to and fro, and at each end of the swing, water rises and pours out into the main channel. Macdonell and Keith find clear references to artificial water channels used for irrigation as practised in the times of the Rgveda.[1] In the Atharvaveda also such references are not wanting." [2]

REFERENCES IN THE EPICS, THE ARTHAŚĀSTRA, THE LAW-BOOKS, THE JĀTAKA ETC

Nārada enunciates, "No grain is ever produced without water, but too much water tends to spoil the grain. An inundation is as injurious to growth as dearth of water." [3] And Bṛhaspati points out, "that man will enjoy produce who sows fertile land, which has many holes and is wet, capable of *irrigation*, surrounded by fields on all sides and cultivated in due season." [4] The Arthaśāstra again, in Bk. 7, ch. 14 points out that irrigational works are the sources of crops. The results of a good shower of rain are ever obtained in the case of crops below irrigational works. There are many references to dikes or water courses in the law-books Two sorts of dikes are mentioned one *Kheya* which is dug into the ground and the other *Bandhya* which prevents the access of water. A kheya dike serves

1. Vedic Index I, p. 214.
2. See Hymn 13, Bk III.
3. See Nārada Smṛti XI, 19.
4. XIV, 23.

the purpose of irrigation and a Bandhya serves to keep the water off.[1] According to Yāgnavalkya, the erection of a dike in the middle of another man's field is not a prohibited act as it may be productive of considerable advantage where as the loss is trifling.[2] In fact, almost all the Law-books loudly exclaim the great merit of excavating water reserviors. In the Sabhāparva of the Mahābhārata, we find Nārada asking Yadhisthira if he was attentive to the improvement of agriculture by digging tanks in his kingdom at proper distances so that agriculture might not have to depend entirely on rain.[3] And the Arthaśāstra in Bk. II, ch. I enjoins that the king shall construct reserviors filled with water either perennial or drawn from other sources. He was also required to provide with sites, roads, timber and other necessary things those who would construct reserviors of their own accord. Indeed, there were co-operative (सम्भूय) institutions for constructing reserviors for irrigation.[4] The Jātaka No. 76 describes how in sign of coming rain, with spade and basket the men will go forth to bank the dikes[5] In the Kunāla Jātaka[6] the Sakyas and the Koliyas are represented as being on the point of fighting with each other regarding the waters of the Rohini, which each wanted when their

1. Nār XI, 18
2 II, 156 Cf Nār XI, 17.
3. Chap. CL. 5.
4 *Loc cit.*
5 See vol I p 190 191 and also p. 188.
6 Vol. V p. 219.

crops began to fag and droop in the month of Jetthamūla In the Vishnuparva of the Harivamsa again, there is a masked reference to the course of the Yamunā being diverted through Brindāvan by Balarāma.[1] It was apparently for agricultural purposes; for, Balarāma is characteristically represented as the wielder of the plough (Lāngala) and the pestle (Mūsala)

That the ancient Indians extensively employed irrigational methods of cultivation is further corroborated by Megasthenes He writes, "India has many huge mountains which abound in fruit trees of every kind and many vast planes of great fertility more or less beautiful, but all alike intersected by a multitude of rivers. *The greater part of the soil is* moreover *under irrigation* and consequently bears two crops in the course of the year "[2] The Arthaśāstra mentions a special Government Officer called Superintendent of agriculture who assessed land at rates varying according to different methods of irrigation. Those who cultivated irrigating by manual labour had to pay $\frac{1}{5}$ of the produce as water-rate, by carrying water on shoulders $\frac{1}{4}$ of the produce, by water-lifts $\frac{1}{3}$ of the produce and by raising water from rivers, tanks, lakes, and wells $\frac{1}{3}$ or $\frac{1}{4}$ of the produce. Remission of taxes was allowed[3] to those who built of their own accord tanks, lakes etc. or repaired neglected or ruined works

1 See Chapter 102

2 See Mc Crindle p 29 30

3. See the Arthaśāstra Bk II, ch 24, and Bk III, ch 7

of similar nature. Chandra Gupta Maurya maintained a regular system of canals and a special department whose business was to measure lands and regulate water-supply by sluices.

The Lake Sudarsana which was excavated by Pushya Gupta the Viceroy of Chandra Gupta and whose channels of irrigation were completed by Asoka, is one of the greatest monumental works that still points to the great importance that used to be attached to irrigation in ancient India. In later times also, kings dug many reservoirs for agriculture, the ruins of which are still to be found in Midnapur, Bankura and Birbhum in West-Bengal, and Tippera and other places of East-Bengal.

Preparation and Application of Manure

PARĀŚARA ON MANURE

माघे गोसयकूटन्तु ... ...[1]
सारं शुभदिनं प्राप्य कुद्दालेनोन्नयेत् ततः ॥
रौद्रे संशोष्य तत् सर्व्वं कृत्वा गुप्तकरूपिणम् ।
फाल्गुने प्रतिकेदारे गर्त्तं कृत्वा निधापयेत् ॥
ततो वपनकाले तु कुर्य्यात् सारविमोचनम् ।
विना सारेण यद्धान्यं वर्द्धते न फलत्यपि ॥

"In the month of *Māgha,* a dung-heap is raised by a spade, dried in the sun and made into smaller balls. In the month of *Phālguna,* these are placed into holes dug for the purpose, and afterwards scattered on the field at the time of

1 Krsi samgraha, p. 24.

sowing. The paddy-plant only grows without manure, it does not bear fruit." 107, 108, 109.

The value of manure in cultivation was appreciated in India as early as the time of the Ṛgveda.[1] Parāśara also wants to point out the importance of manure by the sentence ·

"विना सारेण यद्धान्यं वर्द्धते न फलत्यपि"

The ancient Indians did not apparently know the use of chemicals as artificial fertilisers ; they have come into use only about hundred years ago. Besides bones, flesh of animals, fish-washings, vegetable and animal products etc , the manure that they primarily used consisted of the excreta of various animals mixed with litter which absorbed the urine and kept the animals clean. Whether they knew the exact chemical composition of the yard-manure is not known, but they certainly appreciated its fertilising property and also its physical effects upon the texture and water-holding power of the soil It is only a modern discovery that the farm-yard-manure contains all that is necessary for the nutrition of plants, viz , nitrogen, phosphoric acid and potash. Nitrogen compounds are the chief fertilising elements in the manure, but the nitrogen is inevitably lost to a certain extent. The loss can be minimised only if the dung-heap is not disturbed ; for any disturbance causes rapid fermentation of the liquid portion of the manure, viz., urine, with a consequent increase in the evaporation of ammonia.

1. *Vide Ante.*

The direction of Parāśara to keep the dung-heap undisturbed up to the month of *Māgha*, i.e., for ten months of the year is thus significant. Again, the sentence, "रौद्रे संशोष्य तत् सर्व्वं कृत्वा गुण्डकरूपिणम्" is also significant, for if any easily fermentable material still remained in the active form, it should be got rid of by drying. This process thus reduces active ammonia which would otherwise be injurious to the seeds and the tender roots of plants. The direction "गर्त्तं कृत्वा निधापयेत्" is also very important in as much as the manure, as it decomposes under the earth, increases the stock of humus which oxidises and tends to decrease in the open air, so that when the manure is scattered over the field, it is comparatively rich in humus that contributes greatly to the fertility of the soil. Knowledge of manuring at the time was probably a result of extensive practical and not scientific observations.

THE BRIHAT SAMHITĀ, THE AGNIPURĀNA AND THE ARTHAŚĀSTRA ETC. ON MANURE.

There are also many other writers who speak of manure. Varāhamihira in the Brhat Saṃhitā [1] says, "To promote inflorescence and fructification, a mixture of one *ādhaka* (64 palas) of sesame, 2 *ādhakas* of excreta of goats or sheep, one *prastha* (16 palas) of barely powder, one *tulā* of beef thrown into one *drona* (256 palas) of water and standing over for seven nights should be poured round the roots of the plant" (17, 18) He further prescribes

1 Brhatsamhitā edited by Dr Kern, ch, 55, p 304.

that the seeds before sowing should be treated as follows : They should be taken up in the palm greased with ghee and thrown into milk ; on the following day the seeds should be taken out of the milk with greased fingers and the mass separated into single seeds. This process is to be repeated for 10 successive days. Then, the seeds are to be carefully rubbed with cow-dung and steamed in a vessel containing pork or venison. Then the seeds are to be sown with the above mentioned flesh and lard in a soil where previously sesame was sown and dug up, or trodden down, and then sprinkled daily with water mixed with *Kṣīra*. (19, 20).

"To ensure the growth of *Ballarīs* (i. e, sprouting and the growth of luxurious stem and foliage), the seeds should be properly soaked in an infusion of powdered paddy, *māsa* (bean), sesame and barley mixed with decomposing flesh and then steamed with *Haridrā* (turmeric). This process will succeed even with *Tintidī* (tamarindus indica). For the *Kappittha* (Feronia elephantum) the seeds should be soaked for about two minutes (literally, such length of time as it would take one to make a hundred rythmic claps with the palms (तालशब्द) in a decoction of 8 roots, *Āsphota* (Jasmine), *Āmalakī* (Phyllanthus embellicus), *Dhava* (Grislea tomentosa), *Vāsika* (Tustica guarderussa), *Vetula* (calamus rotung), *Sūryavallī* (Gynandropsis pentaphyla), *Śyāma* (Echites fructescens) and *Atimuktaka* (Aganosma caryophyllata) boild in milk. The seeds then should be dried in

the sun This process, should be repeated for 30 days. A circular hole should be dug in the ground, a cubit in diameter and 2 cubits deep, and this should be filled with the milky decoction. When the hole dries up, it should be burnt with fire and then pasted over with ashes mixed with ghee and honey Three inches of soil should now be thrown in, then the powder of bean, sesame and barley, and then again three inches of soil. Finally washings of fish should be sprinkled and the mud should be beaten and reduced to a thick consistency ; then the seeds previously prepared should be placed in the hole under three inches of the soil and fish washings (with fish). This will lead to luxuriant ramification and foliage which will excite wonder." [1] (26-27).

1 Translation of these verses from the Brhatsamhitā are taken from Dr. Seal's Positive Sciences of the Hindus.

The original verses are :

"अविकाजशकृच्चूर्णस्याढके द्वे तिलाढकम् ।
सक्तुप्रस्थो जलद्रोणो गोमांसतुलयासह ॥ १७
सप्तरात्रो षितैरेतैः सेक कार्यो वनस्पतेः ।
वल्लीगुल्मलतानां च फलपुष्पाय सर्व्वदा ॥ १८
वासराणि दश दुग्धभावितं
बीजमाज्यप्लुतहस्तयोजितम् ।
गोमयेन बहुशो विरूक्षितं
कीडमार्गपिधितैश्च धूपितम् ॥ १९
मत्स्यसूकरवसासमन्वितं
रोपितं च परिकर्म्मितावनौ ।

क्षीरसंयुतजलावसेचितं
जायते कुसुमयुक्तामेव तत् ॥ २०
तिन्तिडीत्यपि करोति वल्लरीं
व्रीहिमाषतिलचूर्णशक्तुभिः ।
यूतिमांससहितेश्च सेचिता
धूपिता च सततं हरिद्रया ॥ २१
कपित्थवल्लीकरणाय मूला
न्यास्फोतधात्रीधववासिकानाम् ।
पलाशिनो वेतससूर्यवल्ली
श्यामातिमुक्तैः सहिताष्टमूलीः ॥ २२
क्षीरे श्रृते चाप्यनया सुशीते
नालाशतं स्थाप्यं कपित्थबीजम् ।
दीने दिने शोषितमर्कपादै-
र्मांसं विधिस्त्वेष ततोऽधिरोप्यम् ॥ २३
हस्तायतं तद्विगुणं गभीरं
खात्वावटं प्रोक्तजलावपूर्णम् ।
शुष्कं प्रदग्धं मधुसर्पिषा तत्
प्रलेपयेच्छ्लक्ष्णसमन्वितेन ॥ २४
चूर्णीकृतैर्माषतिलैर्यवैश्च
प्रपूरयेन्मृत्तिकयान्तरस्थैः ।
मत्स्यामिशान्नैः सहितं च दद्याद्
यावद्घनत्वं समुपागतं तत् ॥ २५
उप्तं च बीजं चतुरङ्गुलाधो
मत्स्याम्बुना मांसजलेन सिक्तम् ।
वल्लीं भवत्यग्र्यशुभप्रवाला
विस्मापनीं मण्डपमाक्रमोति ॥ २६

The Agnipurāṇa [1] gives the following directions:

"A tree becomes laden with flowers and fruits by manuring the soil with powdered barley, sesamum and the offal matter of a goat mixed together and soaked in washings of beef for seven consecutive nights. A good growth of trees is secured by sprinkling them with the washings of fish [1]" While Khaṇā advises the cultivators thus:

"O worthy cultivator, for a vigorous growth of bamboo, give an infusion of powdered paddy to its roots; for the growth of Arum, ash; and for that of cocoanuts, salt.

In the Arthaśāstra it is stated that:

"The seeds of grains are to be exposed to mist and heat (*tusārapāyanam usnam ca*) for seven nights; the seeds of *Kośī* such as *Mudga, māṣa* etc. are treated similarly for 3 nights; the shoots of sugar-cane and the like (*kāndabīja*) are plastered at the cut end with a mixture of honey, clarified, butter, the fat of hogs and cow-dung; the bulbous roots (*kānda*) with honey and clarified butter; cotton-seeds with cow-dung; and water pits at the root of trees are to be burnt and manured with bones and cow-dung at proper seasons The sprouts of seeds when grown are to be manured with a fresh haul of very small fish and irrigated with the milk of *snuhi* (Euphorbia antiquorum)." [2]

1. Translation by M. N Dutt, vol II, p 1038.
2 Shyāmā Śāstrī s translation, 2nd ed, p. 141

Collection and Treatment of seeds

About the collection and treatment of seeds, Parāśara says,

"All kinds of seed should be collected in the month of *Māgha* or *Phālguna*. They are then to be well dried in the sun and exposed to dew at night." "*Putikas* (small receptacles) are afterwards made and the seeds kept in them." "Different kinds of seed must be kept separate, for mixed seeds are not good" "After the seeds have been placed in, the *Putikā* must be well-closed ; grass that may grow out of it must be up-rooted or when the seeds sprout, the field will be full of grass." [1]

Construction of Agricultural Implements

THE PLOUGH.

Parāśara describes the plough and its accessories thus :

"The plough consists essentially of the following 8 parts : *Iśa* (the pole of the plough), *Yuga* (the yoke), *Niryola* (the rod of the plough exclusive of the pole and the share), *Niryolapāśikā* (iron plates that fix the share to the *Niryola*. There are two pairs of *Paśikā*), *Halasthānu* (a strong piece of wood that is fixed to the *Niryola* at the end opposite to where the plough-share is fixed ; this is held by the cultivator while ploughing the field), *Addacalla* (the pins of the yoke where the bullocks are tied), *Śaula* (an extra piece of wood

1 Kṛṣi-samgraha, 148-151.

that tightly fixes the *Niryola* to the pole) and *Paccanī* (goad)."

"*Iśa* is 5 cubits long, *sthānū* 2½ cubits, *niryola* 1½ cubits, *yuga* कर्णसमानकः (?), *niryola-pāśikā* and *addacalla* द्वादशाङ्गुलमानो (i e, about 9 inches, taking the breadth of a finger to be approximately ¾ inch) and *śaula* an अरत्नि (nearly a cubit). *Paccanī* is made of bamboo with iron-top and (सार्द्धद्वादशमुष्टिर्व्वा नवमुष्टिका) about 3 or 4½ feet long, (taking the transverse length of a fist (मुष्टि) to be approximately 4 inches)."

"*Ābandha* (a rod of iron which prevents the *niryola* from getting out of the pole) must be cylindrical and (पञ्चदशाङ्गुल) about one foot long, *Yoktra* (the tie yoke) 4 cubits in length, a rope 5 cubits long and *Phāla* (ploughshare) 1 cubit or (पञ्चाङ्गुलाधिको हस्तो) 1 cubit and 4 inches, *Pāśikā* is नवाङ्गुला (nearly 7 inches) and looks like a leaf of *Arka* (calotropis gigantea). *Viddhaka* (a big hoeing instrument) has twenty-one spikes and the harrow is 9 cubits long"[1]

Besides the plough and its accessories as enumerated by Parāśara, there were also the following agricultural implements :

Sṛni (sickle), *Khanitra* (hoe), *Mūsala* (pestle), *Udūkhala* (mortar), *Sūrpa* (winnowing basket), *Dhānyakṛt* (winnowing fan), *Calanī* (sieve), *Sthivi* (granary), *Methi* (the post of the threshing floor round which cattle turn to thresh out the grains), etc.

1. *Loc. cit.*, verses 110-117 and 96, 97

Ploughing the Land

INJUNCTIONS AND PROHIBITIONS

"In order that the crops may have a luxuriant growth", Khaṇā says, "the cultivator should plough the land under the auspices of the asterisms known as, *Svāti, Uttaraphalgunī, Uttarāsādhā, Uttarabhādrapada, Mṛgaśirā, Mūlā, Punarvasu, Pusyā, Śravánā,* or *Hástā* and on Fridays, Mondays and Wednesdays." "It is unwise to begin ploughing on the day of the full moon or the new moon." "The land should be ploughed 16 times for radish, half the number of times for cotton, half of that for paddy and none for betel" "The soil for radish must be as soft as cotton; and for sugarcane, the soil must be ploughed to dust."

Sowing, Planting, Treatment of Plants, etc

GENERAL

"*Āman* paddy, jute, ginger, arum, tumeric, mango, pumpkin, gourd, cucumber etc. are to be sown in the month of *Vaiśākha*; and sugarcane, plantain and betel are also to be planted in this month if they have not been planted in *Caitra.*" "The field is manured generally towards the end of *Jyaistha.* In this month *Jyaisthik* paddy ripens" "The month of *Āsādha* is the best for planting paddy (i.e., for transplanting the *āman* paddy that is sown in *Vaiśākha*), and also for planting mango, lichis, cocoanut, flower plants, betel etc. In this month, *Āus* paddy begins to ripen." "Pepper, tobacco, kalai and kaluttha (dolichos biflorus) are to be sown in *Śrāvaṇa.* Old trees will surely bear

fruits if the soil at their roots is turned up in this month and fresh soil dumped there in the month of *Agrahāyana.*" "Turnip, sesamum, mudga (mungo) and pepper are to be sown towards the end of *Bhādra.* In this month, *Āus* paddy fully ripens ; and hoeing is done and water drained off from the field (in which *āman* paddy had been sown) leaving just enough for only the roots to be under water.

"In the month of *Āśvina*, the ground must be prepared for the winter crops. *Godhūma* (wheat), mustard, *kalai*, cabbage, potato, radish, beet etc. are to be sown in this month and arrangements made to preserve water in paddy-fields." "Barley, peas, coriander, water-melon, cucumber and gourd are to be sown in the month of *Kārtika*" "In *Agrahāyana, āman* paddy ripens and pumpkin is sown" "In *Phālguna,* winter crops ripen, and if it rains sufficiently, *Āus* paddy is sown."

Now-a-days, *Āus* is mostly sown in the month of *Vaiśākha.* In *Phālguna, Jyaisthik* paddy is sown. There is usually a scarcity of rain in the months of *Phālguna* and *Caitra.* That is why *Jyaisthik* paddy requires a marshy land for its growth.

Rotation of crops was known early in India. *Āus* paddy and winter crops are thus sown in the same field by rotation the former in spring and the latter in Autumn.

"Khanā says, "My worthy cultivator, plant radish towards the end of the 3rd season of the year, sow mustard towards the end of Autumn. And if you mind to make money, sow maze in the

following month of *Caitra*."

In the Kautilīya Arthaśāstra (Eng trans. 2nd ed., pp. 139 f.) the following directions are giving about sowing.

"*Śāli* (a kind of (rice), *vrīhi* (rice), *kodrava* (paspalum scorbiculatum), *tila* (sesamum), *priyangu* (panic seeds), *dāraka* (?) and *varaka* (phaseolus tribolus) are to be sown at the commencement (pūrvavāpa) of the rainy season. *Mudga* (phaseolus mungo), *māsa* (ph. radiatus) and *śaibya* (?) are to be sown in the middle of the season. *Kusumbha* (safflower), *masura* (Ervum hirsutum), *kulattha* (dolichos biflorus), *yava* (barley), *godhūma* (wheat), *kaḍāya* (leguminous seeds), *ātasī* (linseed) and *sarśapa* (mustard) are to be sown last".

PLANTING OF TREES

The following directions are given in the Bṛhatsaṃhitā (chapter 55) and the Agni-purāṇa about the planting of trees :

Bṛhatsamhita · "It is best to plant trees at intervals of 20 cubits, next at 16, and 12 cubits interval is the minimum that can be prescribed" 12.

Agni-purāna · "Trees planted in rows twenty cubits apart should be deemed as the best planted, while those having an intervening space of 16 or 10 cubits between them should be deemed as ranking second best in respect of fruitfulness. Trees should be transplanted 12 times; they should not be planted too close or adjoining each other, in which case, the branches that touch one another

should be lopped off with a chopper, as otherwise, they would bear no fruit. Should barrenness be apprehended, the leaves and branches of a tree ought be sprinkled over with a solution of cold water saturated with *Vidanga*, clarified butter, pulverised *Mudga*, *Māsa* and *Kalutiha* pulse. Similarly, a tree sprinkled with cold water and clarified butter becomes laden with abundant fruits and blossoms.

CUTTING AND GRAFTING

The method of propagation by cuttings and graftings was also known to India from very early times. The following lines from the Brhatsaṃhitā (chapter 55) will be illustrative ; *"Kānthāl* (Jackfruit tree), *Aśoka*, *Kadalī* (plantain), *Jambu*, *Lakuca*, *Dādimbā*, *Drāksā*, *Pālibata*, *Bījapūra* (Mātulanga) *Atimuktaka* these are the plants to be propagated by means of cuttings besmeared with cow-dung" (4-5). "Better than this method is the method of propagation by graftings. This can be done in two ways, the cuttings of one plant is either inserted in the root of another plant or on the stem of another plant (मूलो ऽथवा स्कन्धे रोपणीया: परं तत). Grafts should be smeared with cow-dung. For transplanting (अन्यदेशे नीत्वा रोपयेदित्यर्थ:) the plants should be smeared from root to the top (आमूलस्कन्धलिप्तागा) with ghee (clarified butter), sesame oil, honey of the *ksudra* variety of bees of the *Usīra* (Andropogon Laniger or Andropogon Chitrarum), the *Vidanga* (Embelica ribes) milk and cow-dung." (6-7) "The most suitable ground for

planting is soft soil that has been sown with sesamum indicum and dug up and trodden with sesame in flower."

PARĀŚARA ON SOWING

Directions for sowing paddy are elaborately given by Parāśara in his Krsi-saṃgraha thus :

"Sowing in the month of *Vaiśākha* is best, in the month of *Jyaistha* is tolerable, *Āsādha* bad and *Śrāvàna* worst, Transplanting should best be done in *Āsādha.* It is bad to do it in *Śravaṇa* and worst in *Bhādra.*

"After the seeds have been sown, the field is to be harrowed, otherwise the seeds are not distributed uniformly over the field." 169.

ON PLANTING THE PADDY,

"The seeds are of two kinds one for sowing and the other for planting. Only healthy seeds are used for sowing. Unhealthy seeds are for planting (i. e , the seeds are sown and when they sprout, the soots are transplanted). Full-grown plants should not be raised ; transplanting is to be done while the plants are young. If planting is done in the month of *Śrāvana,* there must remain one cubit of ground between any two plants ; if in *Bhādra,* ½ cubit, and if in *Āśvina* चतुरङ्गुलम् (i.e , about 3 inches). (170, 171, 172).

ON SECOND PLOUGHING

Parāśara says, "आषाढे श्रावणे चैव धान्यमाकृष्येत्". We have already said that the seeds are of two kinds. In the case of those for which transplanting is not necessary, the field is ploughed for a

second time in the month of *Āsādha* or *Śrāvana*, after the seeds grow into plants. This destroys some of them but they subsequently turn into manure and give the rest a healthier growth. "For want of sufficient timely rains, the second ploughing may be done in the month of *Bhādra*, but in that case, the produce will only be half. If the second ploughing is not done before *Āśvina*, the prospect of harvest is little." (174). "Planting or the second ploughing should not be done in marshy land neither should manure be given ; only the grass is to be cleared out." (175).

"If after planting, the field is not hoed, the crops cannot grow in abundance, nor yield a good harvest If hoeing is done in the month of *Śrāvana* or *Bhādra*, the harvest is doubled thereby, even if grass may again grow. If another hoeing is done in the month of *Āśvina*, corns grow as plentifully as *Māsa*." (176-178).

DRAINAGE AND PROVISION FOR WATER

"So that the paddy may not get diseased (नैरुजा) the water in the field is to be drained off in the month of *Bhādra*, leaving just enough for only the roots to be under water." (180).

"The fool who does not make arrangements in *Āśvina* and *Kartika* to preserve water should not expect harvest." (183).

Reaping and Storing

HARVESTING

"In the month of *Paus* (after the *Pusya-yāga*), the wise cultivator reaps full harvest and after

threshing the corns, measures the grains with *Ādhaka*.[1] The measured grains are then stored and are never spent in *Paus* even erroneously." (217,218).

Khanā says : "The corns ripen 30 days after the appearance of flowers and 13 days after the ears bend low." "The corns ripen in the month of *Agrahāyana*. They should be reaped in *Paus*, threshed in *Māgha* and husked in *Phālguna*"

Rotation of Crops

We have already noted that the principle of rotation of crops was early known in India. Indeed, from the very Ṛgveda VIII, 91, 5-6, it appears that crops were grown in the same field by rotation. Again, the verse,

"तथा वर्षेषु वर्षेषु कर्षणात् भूखण्डयः
एकस्यां गुणहीनायां ऋषिमन्यत्र कारयेत् ॥"

clearly points out that the system of fallowing was also early known. The Taittiriya Saṃhitā distinctly mentions that in the course of a year, two crops were harvested from the same field.[2] It also mentions different seasons for ripening of different crops and the proper times for harvesting them. Kautilya says,

"ततः प्रभूतोदकमल्पोदकं वा सस्यं वापयेत्
शालिव्रीहिकोद्रवतिलप्रियङ्गुदारकवराका पूर्ववापाः
मुद्गमाषश्यैव्याय मध्यवापाः
कुसुम्भमसूरकुलुत्थयवगोधूमकलायातसीसर्षपाः
पश्चाद्वापाः....." [3]

1. Here ādhaka is a unit of measure for grains. It is a vessel having a volume of 216 cu inches
2. V, 1, 7, 3
3. The Arthaśāstra, Bk II, ch. 24. For English Translation *vide ante*.

These directions for seasonable cultivation and harvesting obviously point to the practice of rotation of crops in ancient India.

Protection of Crops

Now, as for protection of crops, we have numerous notices of laws and also charms for the destruction of vermins infesting the grains. The Atharvaveda mentions the locusts, the mice, the borers and other devourers of corn [1] and gives an exorcism of these vermins in Hymn 50 of Book VI. In the Kallavāgga, we find the Buddha pointing out that when the disease called 'mildew' falls upon a field of rice. that field of rice cannot last long, neither does a field of sugarcane continue long if the disease called 'blight' falls upon it.[2] In the Ṛgvedic period, we are told, the cultivators kept away birds from the corn fields by making a din and noise,[3] while in the Mahāvāgga, the use of scarecrows is mentioned.[4] The crops were

1 See Hymn 50, Bk. VI.

"Kesava and Sayana in their introduction to the ceremonies prescribed in connection with this hymn at Kausika 51, 17-22 mention a long list of pestiferous insects The performance are as follows 17 While the hymn is being cited, the performer ploughs a furrow with an iron plough about the field 18 He scatters stones upon the field. 19. He ties a hair through the mouth of a *tarda* (insect) and buries him head downward into the middle of the field 20 He while walking offers thrice to the Aswins milk of a cow with a calf of the same colour as herself 21. He offers a *Bali* offering to Āśā (region), to Āśāpati, to the two Aswins and to kshetrapati 22. On the day he performs the ceremonies, he shall remain silent up to the time of sun-set" See S B E vol 42

2. X, 1, 6

3 Rv X, 68, 1.

4. I, 50.

sometimes destroyed by wild deer and we have reference to the cultivators setting traps and snares, digging pit-falls and fixing stakes. (Jāt. No. 11). When the crops were on the field, the cattle were sent out to graze on the pasture in charge of herdsmen. For cases where the crops were destroyed due to the negligence of the herdsmen, the Law-books provided strict laws some of which are appended hereto.

Thus when grain was destroyed, the owner might claim a corresponding quantity of grain as damages. The herdsman was corporally punished and on his master a fine was imposed. The fine was one 'māsha' for mischief done by a cow, two 'māshas' for mischief done by a buffalo and half a 'māsha' in the case of a goat or sheep trespassing with its youngs.[1] The proprietor of the field might seize the cattle and the owner of the cattle would not recover them unless the quantity of grain damaged was not restored by him to the owner of the field.[2] But when the field was "situated on the borders of a village or contiguous to a pasture ground or adjacent to a high road," the herdsman was not responsible for the destruction of grain in that field if the field was not protected by a fence.[3] Immunity was likewise granted to the owner or keeper of a pregnant or newly delivered cow or of one unmanageable.[4] Similar

1. Manu VIII, 241, Yāgñ II, 161; Nār. XI, 29; Gaut XII, 26, Vishnu V, 146
2. See Nārada Smrti XI, 39
3. Manu VIII, 238, 240, Yāgñ II, 162, Nār XI, 40, Gautam XII, 21.
4. See Manu VIII, 242, Yāgñ II, 163, Nār XI, 32

rules are also given in the Agnipurāna with this difference that the fines to be imposed in the different cases were increased four times,[1] pointing probably to an increase in the value of grains in later times.

Agricultural Labour

Hired servants were known in the days the Nārada Smṛti was written. To an agricultural labour whose services were hired, was awarded a third part of the produce. But he was to take a fifth part only if he took food and clothing from the employer.[2] He was required to employ with due care the implements of work that were entrusted to his care and not neglect them wantonly ; and if he failed to perform such work as he had promised to do he was required to pay back twice the amount of wages taken.[3]

In those days, the condition of the landless agriculturists and agricultural labours was far from what it is now. It has already been said that agriculturists had their unions. Naturally therefore, it may be expected that it was they who controlled the market of agricultural produce. It was they again, whose other lawful occupations were trade and banking. At times, if needs there be, agriculturists could get loans from the government whose one interest was to see that they

1 Chap CCLVII.

2. Bṛihaspati XVI, 12, 13. Cf. Nār VI, 3

3. See Manu VIII, 215 , Ap II, 11, 28, 2-3. Yāgñ II, 193. See also the Agnipurāṇa, chap CCLVII.

thrived. Smaller cultivators could find employment by hiring out their labour to their more prosperous neighbours, and the labours that were recruited from the fourth caste might profitably employ their spare time in the many local industries. There was then no such competition of foreign, well organised, machine-driven industries, nor did the industrial factories all tend to collect round cities and towns only, as now; and this only fact above all, forces on us the conclusion that the whole outlook of agriculture and agricultural labour in India was not as hopelessly complicated as we find it to-day.

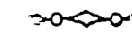
Concluding Remarks

Thus beginning at the time of the Ṛgveda, the science and method of cultivation steadily developed and attained a high stage of perfection by the 4th century B C. In the vedic age, agriculture was the general occupation; each family possessed a number of corn fields in well-marked holdings measured off according to the standard of measurement prevailing in those days. The occupation was then considered noble and each respectable householder was eager to possess a number of cattle and fertile corn-fields. By the time of the Yajurveda, caste-system became fully established and agriculture became the occupation of *Vaiśyas*. In the age of the Brāhmaṇas we find that industrial workers were gradually sinking in estimation, yet agriculture being the staple industry of the country went on developing in the Sūtra

and the Epic periods. After the disruption of the Maurya empire, the political history of India became full of vicissitudes and under inimical political circumstances, agriculture instead of being a concern of the state and a matter of expert knowledge, was relegated to the lowest strata of population. The wisdom that grew in the course of ages remained buried in literature not easily accessible to the mass. Thus neglected and uncared for, the art of cultivation gradually decayed in india.

CHAPTER IV.

CATTLE AND CATTLE-REARING IN ANCIENT INDIA.



Cattle are by far the most important from the point of view of agriculture. We propose therefore to treat in this chapter the subject of "Cattle and Cattle-rearing in ancient India" within a brief compass, and under five heads viz. (1) Cattle objects of great care and religious veneration, (2) Keeping and employing cattle, (3) Diseases and their treatment, (4) Feeding and stock breeding and (5) Concluding remarks.

Cattle : Objects of great care and religious veneration

Cattle is equivalent of Sk "go" Besides cattle, the word "go" has a host of other synonyms such as, the Earth, the Goddess of speech, water, rays of the Sun, a mother etc In mythology, we actually find the cow as a symbolical representation of the Earth, rays of the Sun, or the Goddess of speech.[1] The Buddha again, while preaching against cow-killing says, "Like unto mother ....The cows are our best friends.... .

1: *Vide* the Śatapatha-Brāhmana, II, 2, 1, 21 ; the Śat Br 1, 9, 3, 16 and the Brhadāranyaka Upanisad, V, 10. In the Matsya-Purāna, ch. XI, verse 12, the Earth is represented as taking the form of a cow

As water, earth, gold, wealth and corn, even so are the cows for the men, for this is a requisite for living beings." [1] Life, be it animal or vegetable would have been impossible but for the Sun's rays. It is under their influence that a cyclical change essential for life goes on in nature. Green parts of plants decompose the carbon dioxide given out by the animal kingdom into carbon and oxygen. The free carbon is assimilated by the woody fibres and tissues, and oxygen so vital for animal life returns to the atmosphere. *Āp* is life-giving, the Earth bears all living beings and offers sustenance to them, and *Vāc* is the gracious goddess who feeds the reflective mind. Indeed, the language grows with the development of human thought, and it appears that with discoveries of the usefulness of the cow, "go" grew to be identified with all that sustains body and mind

The primitive Indian feeling for the cow is very beautifully and naturally portrayed in the following hymn [2] of the Ṛgveda.

"Come back, go not elsewhere ; abounding in wealth, sprinkle us , Agni and Soma, you who clothe (your worshippers) again, bestow upon us riches Bring them back again, render them obedient : May Indra restore them : May Agni bring them nigh : May they come back to me and be fostered under this (their) protector :

1 *Vide* the Sutta Nipāta, Brāhmanadhammika Sutta, 13, 24.

2 Rv X, 19.

do thou Agni keep them here, may whatever wealth (there is) remain here. I invoke the knowledge of the place, of their going, of their coming, of their departure, of their wandering, of their returning: (I invoke) him who is their keeper. May the keeper return (with them); he who reaches them when straying: reaches them when wandering and returning. Indra, come back and bring back (the cattle); give us our cows again; may we rejoice in our cows being alive; I nourish you gods, who are everywhere present, with curds, with butter, with milk: may all these deities who are entitled to worship reward us with riches. Come back (ye cows) bring them back; return (ye cows) bring them back; and (you cows) coming back return: there are four quarters of the Earth, bring them back from them" (Wilson's translation).

In the early stage of Aryan civilisation cattle formed the principal property of the people.[1] It is quite natural therefore, that the early Aryans were so anxious for the safe keeping, "going and returning" of their cattle. Indeed, they formed into *gotras* and *gosthīs* for the protection of their cattle against wild beasts and robbers. The literal meaning of *gotra* and *gostha* are respectively common cow-stall and common pasture land. Dr. Das holds that the early days were insecure and a number of families entered into a mutual

1 The pride and joy of a cattle owner is beautifully described in the Dhaniya Sutta of the Sutta Nipāta Dhaniya is said to have had 30,000 cows of which 27,000 were milked daily.

understanding to erect a strong common enclosure for the protection of their cattle. Those families who held a common cow-stall belonged to the same *gotra*, and a number of *gotras* who used a common pasture-land, likewise belonged to the same *gosthī*.[1] Thus, a common interest in cattle furnished the original ground for the socio-economic life to grow.

When the Aryans first settled down they settled down as agriculturists and appreciated the importance of cattle from the point of view of agriculture. The horse could also be used to draw the plough, but was perhaps never so employed. Only in the Ṛgveda, there is a reference to the horse being used to draw cart loads of corn.[2] The fact that it was useless for ploughing except only in dry soil, made oxen indispensable for agricultural work.

Moreover, bullocks and buffaloes were necessary as beasts of burden for drawing carts and caravans,[3] cow-dung was necessary for manuring the fields and milk necessary for daily consumption

1 See Rgvedic Culture, p. 121

2 "Refresh the horses, take up the corns stacked in the field and make a cart which will convey it easily" (Rv X, 101, 7)
It may be noted in this connection that there is absolutely no trace of the horse in the finds of Harappā and Mahenjoderro It is yet to be ascertained whether the horse was domesticated before the Vedic civilisation.

3. Jāt No 1 and 2 describe the story of caravans travelling long distances apparently from *Benares to Aparanta* through the desert of Rajputana
In the Sohgaura copper plate inscription speaks of caravansaries storing fodder and wheat, the loads of ladles, canopies, yoke-pins and ropes for use in times of urgent need.

and for offering libations and also for preparing butter, ghee, curd, various kinds of cakes, sweet-meats etc. from it. Cow-hides were tanned and made into leather vessels for carrying water.[1] Whether in the Ṛgvedic period bones were used as manure is not known ; but in later times, the fertilising property of bones and also of raw-beef was discovered and taken full advantage of [2] Hot fomentation with cow's urine was discovered to be an infallible remedy for hepatic inflamation, a solution of cow-dung in water was found to be a good disinfectant, and dried cow-dung was found necessary for druggists' furnaces.[3]

Again, we find that the Vedic people had no objection to taking beef. In the epic period also, beef and buffalo-meat was used by the people.[4] Jāt. No. 199, refers to the same practice and Dhigha Nīkāya vol. II, speaks of a beef-stall in a prominent place of the city. But even in the Ṛgvedic times, there arose a school of thinkers who raised a protest against killing such a useful animal as the cow "as is shown by the name *aghnya* applied

1. Cunningham's Stupa of Bharut
2. *Vide* The Bṛhat-samhitā, ch. 55, 17-19 and the Arthaśāstra, Bk II ch 24
3. It was necessary for some Ayurvedic medicines to be prepared under a uniformly low temperature The process was to place the ingredients in an earthen vessel The vessel was then inserted well inside the furnace and the *furnace* fed by dried cow-dung A uniformly low-temperature was automatically maintained thereby, and the ingredients entered slowly into chemical composition under that low-temperature
4. See the Mahābhārata, Vanaparva, ch CCV & CCVI Cf the Harivaṁśa Ch. 146, 147.

to it in many passages" [1] of the Ṛgveda. In the Brahmanadhammika Sutta of the Sutta Nipāta again, we find the Buddha enumerating the usefulness of the cow and strongly protesting against cow-killing The protest gradually increased in volume till the custom of cow-killing was totally abolished in a later age.

By the Sūtra period, we find that the cow has already acquired a peculiar sacredness.[2] Wilful killing of a cow was then considered so serious an offence that the killer was to be punished by mutilation. And even if one killed a cow accidentally or happened to be the indirect cause of its death, he was to undergo severely austere penances.[3] The law laid in this connection by the Arthaśāstra is even more drastic.

"स्वयं हन्ता घातयिता हर्ता हारयिता च वध्य।" [4]

i. e. whoever hurts or causes another to hurt, steals or causes another to steal (a cow) should be slain. The Brhaspatismrti in chap. X, 11 enjoins that suspected thieves of cattle should be subjected to the ordeal of the ploughshare, and if the guilt was proved, they should be heavily

1. Vedic Index, II, 146
2 Āpastamba in 1, 2, 30, 20 & 21 says "one should not void his excrements facing cows or stretch out his feet towards them." Cf, Yājñ I, 134, Manu IV, 48, Gautama II, 12, and Viṣnu LX, 22 Again Manu in IV, 45 says that the cowpen is a sacred place Cf Vasiṣtha XXII, 12, Gautama IX, 40 and 45. The Matsya Purāṇa in ch. 80 enjoins the worship of a cow
3 See the Āpastamba Samhitā, ch I The Parāśara Samhitā, ch. IX. The Sambarta Samhitā and also the Agnipurāṇa, ch CCXXVII.
4. See Bk II ch 29,

punished.[1] The ordeal itself was, however, a severe punishment and as such, most certainly produced the desired moral effect upon those who had questionable characters. On the other hand, any act meant for the welfare of the bovine species was highly commendable. In this connection, the following lines from the Agni-purāṇa will be found interesting :

"The cows are holy and blissful and the universe owes its existence to the bovine species. Hallowed is the touch of a cow and hallowed is the ground she stands upon.[2] Cows offer the best sustenance to all sorts of animals.[3] The cows are the holiest of the holiest, the best of all auspicious sights[4] The pools where of a cow would drink should be deemed as a sanctuary. The man who gives morsels of food every day to a cow, is sure to ascend heaven after death. The man who provides a cow even belonging to another with similar morsels of food merits a similar salvation ; while the man who does anything for the welfare of the bovine species in general goes to the region of Brahman after death. The

1. Bṛhaspati in X, 28, 29 says "iron 12 *palas* in weight should be formed into a ploughshare It should be 8 *angulas* long and 4 *angulis* broad The ploughshare having been made red hot in fire, a thief should be made to lick it once with his tongue. If he is not burnt, he obtains acquittal "
2. Cf Vasiṣṭha III, 57 , Manu IV, 124 Baudh 1, 6. 13, 19
3. Cf Satapatha Brāhmaṇa III, 1, 2, 14
4. At Bodh Gayā and other places, we find that 'a cow with a suckling calf' as an auspicious sight, acquired a large place in fine arts.

man who makes the gift of a cow,[1] or sings any hymn in her praise or rescues her life from jeopardy or from imminent peril, ensures the salvation of all souls any way related to him in life." [2]

Thus, the ancient Aryans had always borne in their hearts a tender solicitude for the well-being of their cattle and awarded by the Sūtra period, a peculiar religious veneration to the cow.

Keeping and employing cattle

Not only that, they were very much a practical set of people and laid down specific rules and formulas regarding construction and sanitation of the cow-stall, keeping and employing cattle, their diseases and treatment etc.

Thus in the Kṛsi-saṃgraha we find :

"A cattle-shed should be fifty-five cubits square, and it should never be erected when the Sun enters Leo i. e. in the month of *Bhādra*.[3]

"One who makes his cattle-shed strong and keeps it clear from dung secures a healthy growth for his animals." [4]

"Goats should never be kept in the same shed with cows ; and rice-washing, fish-washing,

1. Visṇu in XCII, 5 says "गोप्रदानेन स्वर्गलोकमाप्नोति।" and in the Bṛhaspati Saṃhitā (edited by Pandit Panchanan Tarkaratna) we find in verse 4, "गोदानं सर्व्वपापेभ्यः प्रमुच्यते।" Cf. Also Vasiṣṭha XXIX, II.
2. Ch CCCXII.
3. See verses 86 and 87.
4. Verse 84.

cotton, husks, hot starch, broom-stick, pestle, or spoiled food, should never be kept in the cowshed." [1]

"To safe-guard against the breaking out of diseases, the cow-house should be occasionally fumigated with vapours of *devadāru* (pinus deodora) *vacha* (orris root) *māmsī* (pulp of fruits ?) *guggula* (a fragrant gum resin) asafœtida and mustard seeds mixed together ; [2] and "a *punyāki* tree (Asa Fœtida) should be planted in the cow-house with a view to improve its general sanitary condition."

As for employing the plough cattle, we find the following injunctions :

"Hungry, thirsty, tired, deformed or diseased cattle should never be yoked to the plough " [3]

"Plough-oxen may be employed for the whole day when they are 8 strong per plough. If the number of oxen yoked to one plough is 6, they should not be engaged for more than three quarters of the day If the number is 4, more than half the day and if the number is 2, more than one quarter of the day only " [4]

1 Verses 88 and 89

2 The Agnipurāna ch CCXCII, 33 and 35

3 The Parāśara Samhitā II, 4.

Cf. "क्षुधिं तादृशीं कुर्याद्यथा वाहान् न पीडयेत् ॥"

(The Kṛṣi-sam 81)

4. द्विगवं वाहयेत् पादं मध्याह्नं तु चतुर्गवं
षड्गवं तु त्रिपादोक्तपूर्णाहश्चाष्टभिः स्मृतः ॥

(The Atri sam)

Atri, Paraśāra, Āpastamba and others say "one who yokes 8 oxen to a plough is a pious man. One who yokes 6, is just a business-man Cruel are those who employ 4 and those who employ 2 are but beef-eaters.[1]

In the Krsi-samgraha again we find such prohibitions as that one should not give his cows' dung to others on Tuesdays, Saturdays and Sundays, and that cows' urine should never be used for cleansing filth, for such acts are supposed to be harmful to cattle.[2]

Gautama in IX, 23, enjoins that a cow suckling her calf must not be interrupted.[3] Baudhāyana in II, 3, 6, 13 says that the rope to which a calf is tied must not be stepped over; and in the Manu Samhitā, IV, 162, we find the injunction that cows must on no account be offended. We have already seen that any act of violence against the bovine species in general was highly condemned.[4] The Arthaśāstra in Book II, Chapter XXVI, explicitly lays down the rule that (वत्सो वृषो धेनु क्षेषामवध्याः) a calf, a bull or a milch-cow shall not be slaughtered, and in Bk. II, ch. XXIX, says, "पशुविक्रेता पादिकं रूपं दद्यात्" (i, e. he

1. "हलमष्टगवं धर्म्मं षड्गवं व्यवसायिनां।
चतुर्गवं वृशषाना द्विगवं गवाशिनाम् ॥
(The Krsi-sam , 95).
Cf Āp I, 23 , also the Agni-Pur. ch. CXLII, 4.
2 Verses 90 and 91
3 See also Manu IV, 59 , Āp 1, 31, 10, 18 , Vasistha XII, 33 and Visnu LXIII, 2
4 The Indo-Iranians also deprecated all violence against the cattle See the Zend-Avesta, Yasna XII, 2

who sells a cow shall pay to the king ¼ the value of the cow. (Dadistan-i-dīnīk in ch. LIII while referring to the sale of cattle for slaughter and foreign eating, enforces certain restrictions to the sale so that the national interest might not suffer).

Cattle constituted a part of national wealth and for their protection and prosperity, was also invoked supernatural aid upon which the Ancients partially relied. In hymn 31, Bk. II of the Atharvaveda we find a charm for the prosperity of cattle and in hymn 14, Bk III, a charm against worms in cattle-shed. Again, the Gṛhyasūtras describe a ceremony to be performed when the cows were sick and also a sacrifice called Sulagava sacrifice for averting plague in cattle. The Kṛṣi-saṃgraha also describes an annual ceremony[1] which was believed to keep cattle hale and hearty. It was to come off on the first day of the full-moon in the month of *Kārtika*, when a nice healthy bull was painted with sandal and *kunkuma* paste and led round the village with the accompaniment of dance, and music. Cattle were all rubbed with a mixture of oil, tumeric and *kunkuma* powder, their bodies marked with a piece of hot iron and the hair at their tails and ears clipped.

Diseases and their treatment

In actual diseases of cattle, we find the following prescriptions in the books.

"Oil prepared from a decoction of *śṛṅgavera* (ginger), *valā* (sida cordifolia), powdered *māṃsa*

1. See the Kṛṣi-saṃgraha, 98-102

(pulp of fruits) and *makṣika* (bee's wax) together with *saindhava* salt (rock salt) should be administered in diseases affecting the horns of cattle. In a case of otalgia, oil boiled with the essence of *manjista* (madder), asafœtida and *saindhava* salt would prove an infallible remedy A plaster composed of the roots of *bilva* (œgle marmelos), *apāmārga* (achyranthes aspera), *dhādakī* (grislea tomentosa), *pāṭalā* (rottleria tinctoria) and *kuṭaja* (wrightia antidysenterica) applied over the gums would prove beneficial to a case of toothache. Drugs mentioned under the preceding malady boiled with an adequate quantity of clarified butter, should be used in diseases affecting cavity of the month. The same mixed with *saindhava* salt should be prescribed in diseases of the tongue. In sore-throat, carditis, lumbago, rheumatic complaints in general, and in general atrophy of the muscles, the remedy should consist of the essence of the two kinds of tumeric and the drugs known as *triphalā* (the three myrobalams). The expressed juice of *triphalā* and *ghṛtamutra* (a medicinal plant, the scum of its infusion resembling clarified butter) should be mixed with the drink of a cow; while *pāthā* (?) and the two sorts of *haridrā* (tumeric) should be deemed beneficial to a cow suffering from an attack of acute dysentery. In all diseases of the digestive organs as well as in maladies affecting the pulmonary capillaries and in cough and asthma, the expressed juice of *srngavera* and *bhārgī* (clerodendrum siphonanthus) should be administered. Broken

bones will be set right by a plaster of salt and expressed juice of *priangu* (panicum italicum); while oil which is a good antidote of a deranged state of the humour of wind, would successfully cope with any sort of bilious distemper of a cow, if prepared and boiled with the drug known as *madhujasti* (the root of abras precatorias). An attack of cold would prove amenable to the expressed juice of *vyosa* (black pepper, long pepper and dry ginger) administered through the medium of honey. while a case of persistent catarrh would yield to a decoction of *Vyosa* mixed with powdered *pushtaka* (cakes)".[1]

Feeding and stock breeding

In the Agnipurāna we find the king enjoined to preserve the breed of cattle in the country The Arthaśāstra mentions a government officer called Superintendent of cattle whose exclusive duty was to supervise cattle in the country, keep a census of cattle and to see that they were being properly reared The superintendent classified cattle as calves, steers, tameable ones, draught oxen, bulls that were to be trained to yoke, bulls kept for crossing cows, cattle that were fit only for the supply of flesh, buffaloes and draught buffaloes ; female calves, female steers ; heifers, pregnant cows, milch kine, barren cattle either cows or buffaloes , calves, that were a month or two old as well as those that were still younger

1 The Agnipurāṇa, ch CCXCII, 23-31

and branded them all along with those cattle which had remained unclaimed for a month or two; and registered the branded marks, natural marks, colour, and the distance from one horn to another of each of the cattle [1] Under the fear of cattle-lifting enemies, cattle owners sometimes kept their cattle under the immediate care of the Superintendent giving him one tenth of the dairy produce.

There were certain restrictions to castrating bulls. Emperor Aśoka issued an order that,

> ". . . ..*Athamipakhāye*
> *dasāye pumnadasāye tisāye punā*
> *vāsume tisa cātumasisu sudivasāye*
> *gone no nīlakhilaviye ajake edake*"[2]

that is to say, a bull, a goat or a ram must not be castrated on the 8th, 10th, 15th and 13th day of each fortnight, neither on the *Punarvasu* day, on a festival day and in every fourth month of the year.

Brahmanical bulls were inviolable and were objects of special attention on certain festive occasions. They were marked on the right flank with a discuss and on the left flank with a trident. In the *Brsotsarga* ceremony which was to take place

1. "वत्सा वत्सतरा दम्या वाहिनो वृषा उक्षानश्च पुङ्गवा युगवाहन-शकटवहा वृषभास्तूना महिषा पृष्ठ्यवाहिनश्च महिषाः वत्सिका वत्सतरी पष्टौही गर्भिणीं धेनुश्चाप्रजाता वन्ध्याश्च गावोमहिष्यश्च मासद्विमासजाता आसासुपजा वत्सा वत्सिकाश्च मासद्विमासजातानक्षयेत् ... ... —

(The Arthaśāstra, Bk. II, ch XXXIX).

2 *Vide* P. E. V

on the day of the full moon in the month of *Kārtika* or *Aśvina*, the bull was set at liberty. It was first marked as above and then washed, adorned and brought near with four young cows which were also washed and decorated. To the right ear of the bull, the mantra "The father of calves" was pronounced and also the mantra "This young bull I give you as husband" was uttered into the ears of the cows Visnu in chapter LXXXIV directs that the bull must be the offspring of a milch cow having young ones living. It must not be deficient in any limb and it must be one who protects the herd In the Matsya-purāna, chapter CCVII, we find the instruction that the bull must have elevated shoulders and hump, a soft and straight tail, tender cheeks, broad back, shining eyes, sharp horns, thick hair on the tail and eighteen nice teeth. Further, the bull must be well-built, roaring like the thunder clouds, high in stature and walking like an infuriated elephant.

The bulls so set at liberty were public property. They were the breeding bulls and that is why the ancients were so particular as to their physical fitness. The Arthaśāstra says that a herd of ten heads of either cows or buffaloes shall contain four male animals.[1]

But the manner in which the stock were fed was most important in so far as the breeds

1 And in Sukādum Nask of Dinkard, Bk III, we find particulars about the time of allowing admission of the bull to the female

depended primarily upon it. In Ṛv X, 27, 8, we find that they were fed on barley and corn, and in the Agnipurāna, we find a calf marvellously thriving on a food consisting of māsa (phaseolus radiatus), sesame, wheat, clarified butter, the cream of milk and salt.[1]

The Arthaśāstra directs that all cattle shall be supplied with abundance of fodder and water, that "draught oxen and cows supplying milk shall be provided with subsistence in proportion to the duration of time the oxen are kept at work and the quantity of milk which the cows supply," and gives an elaborate prescription regarding the nature and quantity of fodder that a bull, a cow or buffalo shall be supplied with.

Thus, "वलीवर्दानां नस्याश्च भद्रगतिवाहिनां यवसस्यार्द्ध-भारः; तृणस्य द्विगुणं; तुलापिण्याकस्य; दशाढक कणपुण्ड्रकस्य; पञ्चपालिकं सुखलवणं; तैलकुडुम्बो नस्यं, प्रस्थः पानं; मांसतुला; दध्नश्चाढकं; यवद्रोण माषाणां वा पुलाकः; क्षीरद्रोणयर्धाढकं वा सुराया.; स्नेहप्रस्थः क्षारदशफलं; शृङ्गिवेरफलं च प्रतिपानम्। पादोनमश्वतरगोखरवानां द्विगुणं महिषोष्ट्राणां कर्म्मकरबलीवर्दानां पायनार्थानं च।" [2]

1 e. "For bulls which are provided with nose-strings and equal horses in speed and in carrying loads, half a *bhāra* of meadow grass, twice the

1. "माषास्तिला सगोधूमा पशुक्षीरं घृतं तथा।
पयो पिण्डो सलवणवत्सानां पुष्टिदायित्वम्॥"
(The Agnipurāna, ch. CCXCIII, 32).

2 See Bk II, ch XXIX.

above quantity of ordinary grass, one *tulā* (100 palas) of oil cakes, 10 *ādhakas* of bran, 5 *palas* of salt, one *kudumba* of oil for rubbing over the nose, one *prastha* of drink, one *tulā* of pulp of fruits, one *ādhaka* of curd, one *drona* of barley or cooked *māsa*, one *drona* of milk or half an *ādhaka* of *surā* liquor), one *prastha* of oil or ghee (clarified butter), 10 *palas* of sugar, and one *pala* of the fruit of *śrngavera* which may be substituted for milk. The same commodities less by one quarter each will form the diet for mules, cows and asses and twice the quantity for buffaloes and camels."

Every village was again, provided with common pasture lands and wood lands. Common rights in forestry and pasture were very important; and in all royal grants of villages, special provisions were always made for them. We find Manu enjoining that "on all sides of a village, a space one hundred *dhanus* or three *samyā* throws (in breadth) shall be reserved for pasture and thrice that space round a town"[1] In the Arthaśāstra (Bk. II, ch 2) also, the king is directed to make provision for pasture grounds on uncultivated tracts ("अक्षष्याया भूमौ पशुभ्यो विवीतानि प्रयच्छेत्"). A part of the fodder was picked up by the cattle themselves from these grazing lands: and the forest lands which by the way, supplied fuel to the people and saved much of the cow-dung now-a-days employed for the purpose with a consequent loss of available manure, were also available to

1 VIII, 237, cf. Yājñ II, 170 and the Agnipurāṇa, ch CCLVII, 18

them.[1] Herds of cattle were taken out to graze by professional graziers to whose interest and to those of their charge, the law-books gave due attention The herdsman was to take cattle to pasture when the night was over and take them back in the evening after they had eaten grass and drank water[2] In olden days as now घण्टातुर्य्यं (sounding bells) were attached to cattle, so that in case they strayed in forests, their whereabouts could be known by the sound of the bells. Sometimes grazing grounds lay within the confines of "forests which were severally allotted for various seasons and from which theives, tigers and other molesting beasts were driven away by hunters aided by their hounds.[3] The Arthaśāstra directs that "cattle shall be grouped in herds of ten similar colours while they are being grazed (वर्णावरोधेण दशतोरक्षा)" The cow-herds were expected to have a knowledge of the diseases from which cattle might suffer and also the remedies[4] They were wholly responsible for the safety of cattle while on pasture-grounds, and if an animal was lost due to the negligence of a cow-boy, he was bound to make good the loss.[5] If an animal died a natural death, he was to surrender the skin

1. "पशुप्रचारार्थं विवीतसालवनेनोपजीवेषु।"
(The Arthaśāstra, Bk. III, ch 10)

2 Manu VIII, 230

3 See the Arthaśāstra, Bk II, ch XXIX

4 "बालवृद्धव्याधितानां गोपालका प्रतिकुर्युः।"
(The Arthaśāstra, *Loc cit*,)

5 Manu VIII, 232, The Arthaśāstra, *Loc cit*

of the dead animal, its fat, bile, marrow, teeth, hoofs, horns and bones.[1] As for remuneration of herdsmen, Manu says, "for tending hundred cows, a heifer shall be given to the herdsman as wages every year, for tending two hundred cows, a milch cow; and he shall be allowed to milk all the cows every eighth day." [2]

After the crops had been harvested, cattle grazed on cultivated fields and also on current fallows. The weeds on cultivated lands, plants growing up from the seeds falling before the harvest, the stubble and the grasses on field borders and along water channels were also available to cattle in olden days as now. Fodder crops were cultivated and made into silage an old process in India as the word *sujavas* [3] in the Ṛgveda indicates. The cultivators also provided hay for his stock.

In the Ṛgvedic period, milch kine were thrice milked during the day in the morning, at noon and in the evening Dr Das says 'It was usually the duty of the grown up daughters *(duhitṛ)* to milk the cows, as *duhitṛ* literally means the milker" and draws a picturesque and animating scene in this connection.[4] In a later period however, we find that definite rules were laid down restricting the time of milking to once or twice according as the seasons were later part of

1 The Arthaśāstra, *Loc. cit*
2 VIII, 231
3 Rv VI, 28, 7, VII, 99, 3
4, *Vide* Rgvedic culture, p 123.

winter, spring and summer or the rainy season, autumn and the earlier part of winter respectively.[1] One *drona* of cow's milk was known to yield one *prastha* of butter and that of buffalo milk one seventh *prastha* more ; and the purity of milk was ascertained by churning. The Arthaśāstra says that "increase in the supply of milk and butter depends upon the nature of the soil and the quantity or quality of fodder and water (भूमि-तृणोदकविशेषात् क्षीरघृतवृद्धिर्भवति ।)." [2] And to increase the supply of milk, the Agnipurāna instructs to give the cow morsels composed of the severed sticks of *aśvagandhā* (physalis flexuosa lin) and sesame.[3]

Thus, it may well be surmised that in ancient days, cattle breeds were fine, milch kine more productive and plough-cattle more efficient than they are generally in modern days.

Concluding remarks

There has now been a general deterioration in the cattle breeds of India. We must seek for its cause in the decrease in the grazing area, the poverty and ignorance of the cultivator and many other factors that are practically outside control under the present circumstances.

1. "वर्षाशरद्धेमन्तानुभयतः कालं दुहुर्.
शिशिरवसन्तयोर्ग्रीष्मिका वालम् ।"

(The Arthaśāstra, Bk II ch XXIX).

2. *Loc cit*

3 See chapter CCXII, verse 35

The Report of the Royal Commission on Agriculture (1928) records many witnesses advocating extension of grazing areas, but finding no possibility of additions to existing grazing grounds suggests concentrating on increasing the productivity. But, poverty of cultivators stands seriously on the way of the suggestion being carried into effect. Majority of the cultivators do not get sufficiently for their own subsistence though by the way, production is by no means insufficient for local demand, and are circumstanced to use for their own personal consumption maize, *bazra*, *jwar* etc , which in olden days were more exclusively used as fodder. One has not got to go far, but only take a trip to the Santhal Parganās and the rural areas of the district of Monghyr to see that cultivators at those places do actually use as their food the fodder crops of cattle. How then, can they be expected to improve the rations of cattle when they are denied facilities to do that of their own ? We shall show later how this fact and similar others tend to ascribe to famine in ancient India a meaning somewhat different from what is associated with famine in modern days.

In ancient days, cattle tending was one of the items of *vārtā* and it was entrusted only to a certain section of the people who thoroughly understood the business. "When Prajāpati created cattle, He made them over to the Vaiśya ; and if a Vaiśya is willing to keep them, it must not be

kept by any other caste." [1] The Vaiśyas were primarily agriculturists and unlike the present-day Indian cultivators, they composed a wealthy section of the community and as such could manage to produce fine breeds of cattle. The Gazetteers in their description of former conditions of India refer to herdsmen as professional cattle-breeders, who understood management of cattle and were so skilful in tending them, that they were able to show good herd. They existed in certain parts of India up to recent times, and to them the Report of the Royal Commission credits the fine breeds that are still to be found in certain parts of the Punjab, Gujrat, Sind, Kathiawar and Madras. The Report observes that there exists a demand from other countries for certain breeds of Indian cattle ; and recommends that the government should not prohibit an export trade, though at the same time points out that good cultivation in many parts of the country may now be hindered because of a deficiency of bullock-power and that a stage has been reached in Bengal in which oxen from other provinces or male buffaloes are brought in to assist in cultivation. We frankly admit that we find it difficult to follow the line of reasonings for recommending an export trade of some fine breeds of Indian cattle when there is so much local deficiency and want. To us, it appears that to improve the Indian live-stock, a necessary check is indispensable to export trade.

1 Manu IX, 326-27.

We are informed that India has a modest external trade in hides and bones. It would be welcome news if the former were tanned hides and more of the latter locally employed for agricultural and other purposes.

CHAPTER V.

THE AGRICULTURIST IN ANCIENT INDIA :



The village has always been the home of agriculturists and has ever borne witness to their joys, sorrows, beliefs and customs.

Vedic Agriculturists & Some Later Pictures

Of the life of the primitive agriculturist of the vedic age, Griffith draws a brief but neat picture. In his words, "the young husband is an agriculturist and we see him in his field superintending the ploughmen and praying to Indra, Pūshan and the Genii of agriculture to bless their labours. Anon with propitiatory prayer, he is cutting a new channel to bring the water of the brook to the land which is ready for irrigation. He is praying for rain and an abundant crop. When the crop is ripe, he is busy among the men who gather the harvest, invoking the aid of the good natured goblins and leaving on the ground some sheaves to remunerate their toil. At sunset, he superintends the return of the cows who have been grazing under the protection of the Wind God in the breezy pastures; and their return under divine guidance, and the reunion of all

members of the household are celebrated with symbolical mixt oblation with milk and brew of grain." [1] The simple wish of the primitive farmer we can read between the following lines: "As the seeds grow in the fields, in the furrow drawn by the ploughshare, thus in me, cattle and every kind of food shall grow." [2] Indeed, cattle formed the principal wealth of the vedic people, and we find numerous hymns meaning solicitude for their welfare. Kægi observes, "the principal means of subsistence was cattle keeping. Repeatedly in the hymns, we meet with the prayer for whole herds of cows and horses, sheep and goats, heifers and buffaloes, but specially of milch cows which are to more than one singer the sum of 'all good which Indra has created for our enjoyment.'" He further says, "After the cattle, the most important interest is in the cultivation of the soil. The ground is worked with plough and harrow, mattock and hoe and when necessary watered by means of artificial canals. Twice in the year the products of the field, specially barley ripen, the grain threshed on the floor, the corn separated from husk and chaff by winnowing, is ground in the mill and made into bread." Such was in brief the agricultural life of the vedic people.

In later times, with the rise of the *Ahiṃsā* doctrine, agricultural profession came to be disliked by the virtuous. The Buddha is represented

1. Preface to the Atharvaveda
2. See the Atharvaveda, Bk VI, hymn 6, stanza 33.

in the Budhacharita of Asvaghoṣā as filled with compassion at the destruction of eggs and young little insects by the plough and the toilsome life of the agriculturist." [1]

From the beautifully graphic stories of the Jātaka, can be gleaned much of the life of the agriculturist as it was in Post-Vedic India. The farmer after he rose in the morning would go to the field with his men and giving them orders to plough, retire to a pool close by with a tooth-stick in his month.[2] Having chewed the tooth-stick, he would go down into the pool and cleanse his teeth, wash his mouth and face [3] and perform his morning duties there. He would then return to the field and supervise the labour. When mid-day meals were brought by the maid-servant of the house,[4] he would call out his men and sit down to dinner. When he had finished, the maid-servant would be sent away and he would again mind the business of the day. In the evening, the farmer would repair homeward with the oxen, and after seeing that they were driven to the cowpen and ministered to, he would meet his loving wife and children who had been anxiously looking forward to his return at the fall of day.

1. Bk. V, 4-6
2. Viṣṇu in ch. LXI, 14, 15 advises that the twigs of the Banyan tree or of the Arka plant or of the Khādira or Karānga or Badara or Sāl or Nimba trees or of the Arimedha shrub or of the Apāmārga or Mālati plants or of the Kukumbha or Bel trees or of the Kasāya tree or of the Tikta or Katuka plants should be used for tooth-stick.
3. See Jāt No 389
4. See Jāt No 354

Jāt. No. 354 relates the story of a farmer's family consisting of man and wife, two children a son and a daughter, a daughter-in-law and a maid-servant of the house. They lived happily and affectionately together. One day the farmer went with his son to plough his field. The son collected together dry leaves scattered over the field and set fire to them. The issuing smoke hurt the eyes of a snake who lived in an ant-hill close by. The snake in a rage bit the farmer's son and he fell down dead. The farmer on seeing him fall, left his oxen and came over to his son and finding that he was dead, he took him up and laid him at the foot of a tree nearby after covering his body with a cloak. Just then a neighbour was passing by. On seeing him, he requested him to convey the news to his wife and ask her to come to the field with other members of the family dressed with clean garments and with perfumes and flowers in their hands. In the mean time, firewood was gathered and a funeral pile made When the other members of the family arrived, the body was lifted to the funeral pile and they all made offerings of perfumes and flowers and set fire to it. Such accidental deaths of cultivators due to snake-bite are referred to in other stories also. In such cases probably doctors [1] were usually called in at first, but in many cases death occurred causing much distress to the bereaved family. Jāt No 257 again, records another accidental

1. Doctors skilled in the cure of snake-bites are referred to in Jāt No 69

mishap occurring to a farmer's family: A cultivator took loan of a pair of oxen. All day long, he ploughed with them and then gave them grass to eat and went to the owner's house to give them back. Just then the owner was taking his meals. The oxen entered the house and the ploughman departed without formally making over the oxen. During the night, theives broke into the cow-pen and stole the oxen away. Early in the morning, the owner entered the cow-shed but finding no cattle there, went to the ploughman and according to custom picked up a bit of stone and said "Here is the king's officer, come along." So they went together towards the king's court. On the way, the ploughman entered the house of a friend to get something to eat. But the friend was not at home. The wife said there was nothing cooked and asked him to wait till she cooked something for him. She climbed a ladder to the grain store and in her haste, she fell. And as she was seven months gone with a child, a miscarriage followed.. .. .. In Jāt. No. 67 again, there is a story of three ploughmen who were hauled up before the king as supposed robbers and were later released through the wisdom of a female relative. And Jāt. No. 516 narrates how a Brahmin husbandman lost his oxen after he had finished ploughing for the day and how in his fruitless search for them, he lost his way in the forest and roamed there for days without any food.

On the other hand, we are told in Jāt. No. 56

how a farmer while one day ploughing a field where once stood a village, came by a buried treasure and how he thought within himself to use ¼ of the treasure in charity and good work, ¼ to trade with, ¼ to live upon and the remaining ¼ to bury as a treasure. The story brings clearly into relief the wishes and aspirations of the simple peasant of the olden days.

Jāt. No. 218 describes how a trader who was apparently farmer also, deposited 500 ploughshares with a friend who ultimately tried to misappropriate them on a false plea Stealing or misappropriating ploughs was heavily punishable, and more so if it was done in the season of ploughing; [1] while making a gift of them was believed to be highly meritorious. The Agnipurāṇa says, "the ploughshare should be plated with gold before the gift, whereby the giver would be glorified in heaven." [2] Whether or not, the giver is really glorified in heaven, this is at any rate clear that such prescriptions were meant to increase the agricultural assets of the country and also to induce people to encourage agriculturists in their occupation.

The agriculturists sowed different kinds of grains, planted sugarcane, cotton, different kinds of vegetables such as pumpkins, gourds, cucumbers etc. To scare away birds, they made use of scarecrows; and towards the harvest

1 Manu IX, 291.
2. Chap. CCXI

time, when crops stood thick in the fields, the peasant anxious to kill the creatures that devoured crops used to dig pit-falls, set traps, fix stakes and snares.[1] At the sight of coming rains, they would hurry to the fields with spade and basket in hands to bank the dikes, and the women of the house make haste to carry indoors rice and crops that were spread in the Sun to dry, lest the harvest should get wet[2] Jāt. No. 140 gives a very interesting picture of a female slave dozing in her watch over rice that was spread out in the Sun to dry and of a goat watching chance to fall upon the rice.

When crops were ripe, the threshing floor was made ready and *methi*[3] planted with care in an auspicious day. The harvest was then threshed, winnowed and lastly garnered after setting aside the rice of the king's tax that was measured by a grain basket. For each basket-full of rice, a grain was used as a maker.[4] They stocked rice, wheat, barley and other food staff in the month of *Jaistha* and also in the month of *Kārtika*, for they would sell at an advantage in the month of *Māgha*.[5]

They were god-fearing and on the whole happy and contented

Agricultural acts were all ceremonial. A farmer before cultivating his field would offer oblations to the gods of the elements. The

1. See Jāt No 11
2. ,, ,, 76
3. *Methi* is the post of the threshing floor round which cattle turn and thresh out grains.
4. See Jāt No. 276
5. See the Agnipurāna ch. CXXVIII.

ploughman would then drive the plough made after the sanctioned pattern and worship the aforesaid gods for a good harvest with garlands of white flowers and perfumes and other articles of offering, after which the God Śunasira would be invoked and worshipped. The above ceremonies were conducted on the occasion of transplanting or mowing down the rows of paddy plants or on the occasion of unfastening the ploughshare or removing the threshing plank. After grains were garnered, the following mantra written on a leaf and placed amidst the heap of rice under the influence of asterisms known as the three *Pūrvas, Vishākhā, Dhanisthā,* or *Varunā* was believed to give an increase in the produce of the same "Om ! salutation unto thee, oh, thou God of all wealth who grantest opulence to thy votaries. I make obeissance to thee. Dost thou give me wealth. Oh ! obeissance to thee, oh Goddess Ila (Lakshmi) under whose fostering care population thrives and who art the desire incarnate ; dost thou give me wealth in the course of the new year." And rice was forbidden to be taken out of the granary except on the days marked by the six aforesaid asterisms.[1]

The agriculturists were thus a god-fearing people They were good natured, hospitable and they usually lived in villages and mostly in thatched houses with mud walls plastered with cow-dung.[2]

1. See the Agnipurāna, ch. CCLIX & CXXI
2 See Jāt. No 66.

It was the duty of the king to see that they enjoyed security and happiness, as it appears from the question asked of Yudhiṣṭhira by Nārada in in the Sabhā parva of the Mahābhārata, Bhīsma's advice in the Śānti parva and the numerous references in the Law-books, in the Arthaśāstra and the Purānas. In the Bṛhaspati Smṛti, we find the law that husbandmen at the time of harvest must not be put under any restraint. [1] The Arthaśāstra in Bk. II, chap. I says "दण्डविष्टिकरावाधैः रक्षेदुपहता क्षषिम्।" i. e. (the king) shall protect agriculture from the molestation of oppressive fines, free labour and taxes; while the Agnipurāṇa in chap. CCXXXIX, 44 45, enjoins,

"क्षषिवणिकपथो.....
अष्टवर्गमिम राजा अनुपालयेत्॥"

According to the testimony of Megasthenes, husbandmen were exempted from fighting and other public services. They were far more numerous than others, devoted the whole of their time to tillage and were as a class, regarded sacred and inviolable. Even in times of war, "the combatants on either side in waging the conflict make carnage of each other, but allow those engaged in husbandry to remain quite unmolested." [2]

Agriculturists had their joys. Even a day labourer is represented in Jāt. No. 421 as saving half a *māsha,* so that he might spend it in a coming festival and enjoy with his sweet-heart.

1 II, 37
2 *Vide* McCrindle, p. 31, 32 & 39.

Drinking festival is often mentioned in the Jātaka, in which cultivators also presumably joined. Drinking was however usually discouraged and the people fully knew the vices attending it.[1] We learn from the Epics also, that drinking was a common vice of the people, though passages meant to bring home to them the evils of drinking are not rare in the books For the agriculturist particularly, the Kārtika festival and the ceremony of Pushya-jātrā were great occasions. The former was believed to keep cattle hale and hearty. A cow was worshipped and all the cattle were dressed and decorated and a healthy bull led round the village with the accompaniment of dance and music ; while the latter was an annual social function coming off in the month of *Paus* The cultivators would go to the field on an auspicious day to perform the ceremony and there feed all beginning with old men first, on boiled rice, fish and meat, excellent vegetable curries spiced with asafœdita and pepper, curd, milk, clarified butter, rice boiled in milk, varieties of cakes, fruits and roots and different kinds of sweetmeat. After cleansing their hands and mouth, they would then chew betel-leaves scented with camphor and rub on each other scented oil and sandal paste. Then they would wear new clothes, adorn themselves with flowers and after bowing to God Indra engage themselves in merrymaking with dance and music. Thus gay and cheerful, they would

1 *Vide* Jāt. No. 512, 537.

face towards the Sun and with folded hands utter certain mantras, at the end of which, they would repair to their respective homes.[1]

They were thus happy and contented. The only serious external inroads upon their happiness was due to occasional famine resulting from drought.

1. See the Kṛṣi samgraha p. 23 and verses 206-216.

CHAPTER VI.

FAMINE IN ANCIENT INDIA :

The current theory grossly misleading

The early Indians believed that if Indra was duly propitiated, they would have plenty of crops and famines and scarcities would be far from their doors. If so, it would be rash to stigmatise this belief as a mere superstition It might have had a substantial basis; otherwise, Indra-worship would not have been continued and continued enthusiastically for thousands of years. It is remarkable that there is no distinct mention of famine in the Ṛgveda. Only, in Bk. III, 112, 11, we find a reference to drought. Ṛv. II, 15, 5, refers to scarcity causing a number of people to migrate northward by crossing the Parushni. There are few other stray references, and it can safely be said that famines were very few and far between in the time of the Ṛgveda when Indra-worship was greatly in vogue

In later times, we find the king of Ayodhyā boasting of his kingdom as full of cultivators and abounding in corn (The Ayodhā Kānda chap. LXVIII). In chapter I of the Bāla Kānda of the Rāmāyana again, it is told that in the reign of

Rāma, people will have nothing to fear from scarcities and famines The kingdom of Anga is however represented as overtaken by drought during the reign of Romapada Mahārāja ; but it is significant that the evil is attributed to a default on the part of the king (The Bāla Kānda, chap. IX 7-9). Jātaka No.276 also contains a similar idea. It narrates how famine arose in Dantapura due to an unusual drought and how later by observance of virtue by the king, rain was made to fall, crops grew in abundance and the usual prosperity of the kingdom restored. Indeed the people and the king both believed that no calamity could befall a kingdom if the king were virtuous ; and if any befell a country due to a default on the part of the king, it could be got over by the king expiating his wrong. Jāt. No 75 refers to a drought in Kosala, while Jāt No. 199 speaks of a famine as a result of heavy downpour of rains during the rainy season. The Chhāndogya Upanisad refers to a famine afflicting a district for long 12 years. Such references lacking in details as they often are, have led to the theory that in ancient India, terrible famines were frequent and long continued. But we find it difficult to imagine how acute famine confined to one tract of the country could last for a long period unless the afflicted tract was deserted by the people at the onset and turned into a desolated waste for that period. On the otherhand Megasthenes stands for the statement that "famine has never visited India." (McCrindle, p 31) The question of the relative veracity of

Megasthenes may not be discussed here, and we may agree with Schwanbeck that "the knowledge of ancient India derived from the books of Megasthenes has only approached perfect accuracy the more closely those who have written after him on India have followed his Indika?".

Famine is the English substitute for Sk. "*Durvikṣha*" which literally means a condition in which alms *(Vikshā)* are obtainable with difficulty. In ancient India, famine therefore, might mean anything from absolute scarcity to non-abundance of grains. The following story taken from the Jātaka will be found interesting here :

"Once the grains had been carried away during the rainy season and there was "famine". But it was the time when the corn had just sprouted and all villagers came together and besought help of their headman saying "two months from now, when we have harvested the grain, we will pay you in kind". So they got an old ox from him and ate it. One day, the headman watched his chances for carrying on an intrigue with the wife of a householder and when the householder was gone abroad, he visited the house. Just as the two were happy together, the man came in by the village gate The woman was looking towards the village-gate and saw him. She told the headman, 'do not be afraid, I have a plan. You know we have had meat from you to eat. Make as though you were seeking the price of the meat. I will climb up the granary and stand at the door of it while you must stand on the middle of the room

and insist on payment.' The goodman entered the house and saw what they were about He called the headman, 'Sir, when we had some of your old ox to eat, we promised to give you rice for it in two months' time. Not half a month has passed. Then why do you try to make us pay now. That is not the reason you are here ..... ' and to make his meaning clear, he uttered the following lines :

'I like not this, I like not that, I like not her I say
Who stands besides the granary and cries 'I cannot pay'
Nor you, nor you Sir ! listen now my *means and store are small*
You gave me once a skinny cow and two months' grace withal
Now ere the day, you bid me pay, I like not this at all."

(Cowell)

Thus, if there was an absolute dearth of grains, it is curious how the whole village could live on an old ox for two months. Yet it is definitely told that there was famine. At the same time, we are informed also that the store of the villagers was (not empty but) small.[1] Famine

1. It is worthwhile to note in this connection the meaning of the Bengali-word "bādanta " Bādanta=Bāder Anta=Exhaustion of surplus In olden days a householder signified his inability to give alms by saying "Bhāndār bādanta" i e. "There is no surplus in the store " Up till to day, the same word is used in Bengal-households, but significantly enough not in the sense it was used in olden days. Now a days "Bhāndār bādanṭa" means "the store is empty."

in ancient India did not therefore always mean such a destitute and forlorn condition as we understand by it to-day. Of course, we have some references to a destitute condition of the people as caused by famine. But a scientific analysis of the determining factors of famine as applied to ancient India would tend to show that acute famines were few and far between in olden days.

A comparative survey of the determining factors of famine

The Agnipurāna ascribes famine to either of the two causes of absolute dearth or excessive rain. But excessive rain was presumably rare or we would have found the people as much anxious to avert it as they were for securing timely rainfall. Indeed, nowhere do we find mention of any sacrifice or ceremony to stop an excessive downpour of rain. Kautilya in Bk. VIII, ch 2 says "absence of rain is worse than too much rain," for excess of water could be drained off or kept off the field by 'kheya' or 'bandha' dykes respectively (The Nārada Smriti XI, 18) Acute famine was therefore mainly and primarily determined by drought.

For a scientific enquiry however, as to whether or not famines in ancient India were more frequent and acute than now, let us make a brief comparative survey of the following points in relation to ancient and modern India :

(1) Forest and rain-fall.
(2) Irrigation and method of cultivation.

(3) The agricultural land and population.
(4) Cattle and bullock-power.
(5) Transport facilities and Export.

Forest and Rain-fall

Beyond the outskrits of villages lay stretches of forest where the villagers had common rights of waste and wood. The Arthaśāstra mentions a government officer called the superintendent of forest *(Nāgavanādhyaskhah)* and enjoins that the king shall keep in good condition forests created in the past, preserve game forests, elephant forests, forests for Brahmins, separate wild tracts for timber forests and also set up new ones *(raskhetpūrbakṛtanrājā nabāṃścha pravartayet)*. But disforestment has begun in India definitely from the time of Babar and has been continued ever since The result is that rain-fall has considerably decreased, water-level has sunk in many tracts and many tracts have turned into desolate waste. Once navigable rivers to *wit*, the Saraswati, the Behula have been altogether silted up. Saptagrām on the Saraswati once an important port and prosperous city is now practically a jungle. Dredging these rivers is a good business at least from the view-point of health and prosperity of the tracts on their banks and of the people living thereon.

Forests again, play an important part in the control of stream-flow and protection of flood. Apart from sinking water-level and consequent silting up of many rivers, floods and consequent

destruction of land by erosion, the disforestment has produced even more serious effects. The people deprived from cheap fire-wood resort largely to burning cow-dung as fuel. The available manure has thus considerably decreased. Not only that. The absence of surrounding forests and incidentally, an export trade of bones collected to some extent from the fields, have deprived the fields from a further source of organic matter thus reducing the fertility of the soil to an extent.

Irrigation and method of cultivation

Over a large part of the country rain has always been unequally and irregularly distributed and surely, that is why, we find that from very early times, Indian cultivators have sought to supplement the rain-fall by digging wells and conserve it by tanks and storage reservoirs. And evidences both literary and monumental have already been given to show that great solicitude was displayed for irrigation in the past. Further, if we believe Wilcoks, we must have to admit that much larger and more extensive irrigational works were carried out in ancient days than have yet been attempted in modern times.

As for the method of cultivation as practised in olden days of India, we have seen that the ancient Indian cultivators comprised a wealthy and respectable section of the people and possessed a fair knowledge of climatology, plant

physiology, soil classification, seasonable cultivation, rotation of crops, protection of crops, treatment of seeds, and different kinds of manure. Indeed, one will be filled with astonishment and admiration if he cares only to look into the elaborate injunctions as are found in the Arthaśāstra, the Bṛhat-Saṃhitā and the Agnipurāṇa regarding selection and treatment of seeds and the use as fertilisers of animal excreta, fish and bones, beef and fish-washings, minute fishes and various kinds of mixtures and decoctions. Except what is given in Khāna's maxims, the ancient agricultural formulæ are now forgotten, and it is only too evident that agricultural methods have suffered much deterioration in modern India.

The agricultural land and population

From ancient days down to a long time after the Christian era, agricultuturists were all Vaisyas whose other occupations were cattle-tending, trade and banking. As such, the word *'Chāsi'* in those days never meant anything dishonourable as it is now unfortunately thought to do, due to a diseased and perverted mentality. Originally, cultivation of the soil was the significant characteristic of the Ārya and distinguished the civilised from the barbarians. Indeed, in ancient India, agriculture was not to be relegated to the lowest strata of population as now, but had always been the occupation of a class of men who were respectable and educated, who knew their rights

and exercised them and held an important position in the State.

Proprietary right on the land, then lay with the *Chāsīs*, who paid only a defined portion of the gross produce to the king as tax in return of his good government. Division of labour and laws were so formulated that they indirectly safeguarded the interest of agriculture and agriculturists. No land was allowed to lie fallow. If one failed to cultivate his field or cause it to be tilled by others, he would lose the right to have any interest thereof, and any other deserving man might cultivate it and enjoy the produce. This together with the fact that cultivators had their own unions, forces upon us the conclusion that land-owning non-agriculturists if there were any, were practically in the grip of cultivators and were eventually forced to give up their lands to those whose particular profession was to cultivate. Laws about debt and usury, sale and mortgage gave the necessary check to cultivators' indebtedness. The money-lender was also a Vaisya and presumably a wealthy farmer, so that if land at all went out of the hands of a small peasant proprietor, it went to a wealthier neighbour-farmer, thus tending to effect a consolidation of the agricultural land rather than its fragmentation. Hindu laws of inheritance have a tendency to effect sub-division of holdings. But joint-family system was largely in vogue in ancient India; and there is nothing to disprove that instead of dividing the land, one brother farmed

it and shared the crops with other brothers. This was not impracticable. There were no external factors to throttle rural manufacturing industries, and other professions were also legally open to them in which they could profitably engage themselves and thereby supplement the income of the family. Also we have references to different parties joining together to cultivate their fields and there were distinct laws for such partnership concerns. Thus farming on large scales, the indirect check to excessive sub-division of holdings and rural manufactories kept down the pressure on land though agriculturists were far more numerous than others in olden days as they are so now. The condition of agriculturists was good and standard of living modest. In modern days, the conditions are all contrary, and it is enough to note here that agricultural produce is yet more than sufficient for India's internal demand.

Bullock-power

In olden days, the breeds of cattle were apparently fine; for, cattle tending was then in the hands of a class who understood the business and had means. The Report of the Royal Commission on agriculture points out that certain parts of India still show very fine breeds of cattle and observes that they may be traced to the skilful tending by some nomadic herdsmen who formerly supplied cattle to cultivators, and probably existed up to recent times

In many parts of the country particularly in

Bengal however, the report indicates, bullock-power has come to such a low stage of deficiency that good cultivation would ere long be impossible. To improve the live-stock, the report recommends many methods amongst which some seem impracticable under the present circumstances unless they are supplemented by more vitally important ones. The report could not see its way to recommend extension of grazing areas; while it definitely advises the Government not to prohibit an export trade in some fine Indian bulls of which foreign countries have a demand In the face of so much local deficiency and want, we find the advice really perplexing.

Transport Facilities and Export—

Transport was less facile. And as for export, we learn from the authoritative Periplus that food stuff was exported from Barbaricum (Karachi ?), Muziris (Cranganore), Barygaza (Broach), Nelcynda (a port 500 stadia from Cranganore) Bacare (Porakad), the Gangetic delta and the Makran Coast in the extreme N W. to Dioscorida island, Cana, Moscha in Arabia and further west. But the surplus only, was exported after keeping sufficient to meet internal demands Every village used to keep by a store of grains as a provision in times of emergency From the Arthaśāstra, Bk II, ch. 15, we learn that of the Royal Store, half used to be kept in reserve to ward off calamities of the people. In Bk. IV, ch. 3 again, we find the injunction that in times of scarcity, help

must be given from the Royal Store. From the Sohgaura copper-plate inscription also, we learn that in caravansaries, a store used to be kept in reserve for times of need. In modern times on the other hand export-statistics speaks eloquently for itself.

Multhus's Theory applied

Again, many small-scale industries that were once highly prosperous have been destroyed with the result that thousands of skilled men formerly engaged in those industries have been driven into agriculture thus accelerating the pressure on land, and rendering a large portion of agriculturists unemployed and idle for a considerable part of the year and consequently poorer. The baneful effect of this on agricultural capital has also been incalculable. It can not be denied that the productive efficiency of agricultural labour is now at a much lower level than it was formerly, and that the limitations of the Law of Diminishing Return and those of the Malthusian Theory do not apply to India. What scientific reason is there then to show that famine and its horrors were more acute in ancient days than now?

Modern conditions more favourable to occurrence of famines

On the other hand, the above facts show that in olden days, conditions were distinctly far more unfavourable to occurrence of famine than they are now and tend to ascribe to 'famine in

ancient India,' a meaning somewhat different from what we understand by famine in modern days. They also lead us naturally to the conclusion that in ancient India, famines were much less frequent and usually much less terrible in character than now, inspite of the fact that cross-country communication was then slow and difficult, caravans and boats being the only means by which surplus agricultural and other industrial products could be transported from one district to another, and hence any relief measure to an afflicted tract neither immediate nor easy The cause of recurrent acute famines of which India is in modern times the only victim is not far to seek, if only we take into account the quantity of food stuff annually exported to foreign countries from her capacious shores.

There are men who deplore lack of communication of the many remote Indian villages with commercial centres and advocate commercialisation of agricultural produce, holding out that commercialisation would tend to increase the price and thus help in the betterment of the condition of cultivators. But, if national wealth is not prevented from being drained out for lack of facilities in manufacturing enterprises, commercialisation of raw-produce alone, would mean only just what it has meant so far in recent times; and one need not point out here, that though the price of food stuff has had a considerable rise within the last century, the condition of cultivators instead of being better proportionately has

rather been much the worse for it. To meet with the price of Indian raw-materials, foreign manufacturers have ever been trying to thrust their finished goods into Indian markets and make it impossible for Indian manufactories to survive the raids. Being unable to compete with more powerful adversaries, many manufacturing industries of India once highly prosperous have resulted in dying out within the last century. For an economic independence of a country, manufacturing industries must go hand in hand with agriculture ; and commercialisation has no sense if it is not consistent with national protection.

Of course, isolation of villages is a bar to improvement of manufacturing industries for want of healthy competition. But in ancient India, though communication between different districts was less facile than now, we have yet many references to merchants travelling from one district to another briskly carrying on their trade. From the Jātaka, we hear also of a whole village being inhabited by blacksmiths or potters or weavers or carpenters or other industrial workers, so that there was really no want of competition. Again, in Jāt No. 186, 190, 195 and others, we find distinct references to over-sea trade also, and only Pliny's remarks are sufficient to show that Indian goods did not sell at a discount in foreign markets

Modern conditions are however much different from what they were in general in those days

when "the excellent manufactures of India were known to the Phœnicians and in the markets of Alexandria," when the provinces were alive with the bustle of manufacture and commercial undertakings (the Agnipurāna 239, 24, 26) and " the inhabitants had abundant means of subsistence in consequence of which" Megasthenes says "they exceeded the ordinary stature and were distinguished by their proud bearing."

CHAPTER VII.

PRAYERS AND SACRIFICES RELATING TO AGRICULTURE IN ANCIENT INDIA :



We have said that every agricultural act was ceremonial. Indeed so ! and without a brief description of prayers and sacrifices relating to agriculture, agriculture *in ancient India will only* be partially presented. We, therefore give some of them below :

Hymn to Kshetrapati

Griffith translates the hymn as follows :

1. "We through the master of the field, even as through a friend, obtain what nourisheth our kine and steeds. In such may be the good to us."

2. "As the cow yieldeth milk, pour for us freely. Lord of the field the wave that beareth sweetness, distilling meath, well-purified like butter and let the Lord of the Holy law be gracious"

3. "Sweet be the plants for us, the heavens, the waters and full of sweet for us be air's mid region. May the Field's Lord for us be full of sweetness and may we follow after him uninjured."

4. "Happily work our steers and men, may the plough furrow happily. Happily be the traces bound; happily may he ply the goad."

5. "Śuna and Sira, welcome ye this land and with the milk which ye have made in heaven, bedew ye both this earth of ours."

6. "Auspicious Sītā, come thou near; we venerate thee that thou mayst bless and prosper us and bring us fruits abundantly."

7. "May Indra press the furrow down, may Pusan guide its course aright. May she as rich in milk be drained for us through each succeeding year."

8. "Happily let the share turn up the plough-land, happily go the ploughers with the oxen. With meath and milk, Parjanya, make us happy. Grant us prosperity, Śuna and Sira" [1]

Prayer for abundant produce

In the Atharvaveda, Hymn 17 of Book III is a beautiful prayer and song of the simple ancient agriculturist, as will be seen from the following translation:

"Wise and devoted to the gods, the skilful men bind ploughshares fast, and lay the yokes on either side. Lay on the yokes and fasten well the traces: formed is the furrow, sow now the seed within it. Virāj vouchsafe us hearing fraught with plenty! Let the ripe grain come near and near the sickle. The keen-shared plough that

1. Rv. IV, 57.

bringeth bliss, furnishes with traces and with slits ; shear out for me a cow, a sheep, a rapid drawer of car, a blooming woman, plump and strong ! May Indra press the furrow down ; may Pūsan guard and cherish her. May she, well stored with milk, yield milk for us through each succeeding year. Happily let the share turn up the ploughland, the plougher happily follow the oxen. Pleased with our sacrifice Śuna and Sira ! make the plant bring this man abundant produce * * *."

A benediction during the sowing of seeds

1. "Raise thyself up, grow thick by thy own might, O grain! Burst every vessel! The lightning in the heavens shall not destroy thee."

2. "When we invoke thee, god grain and thou dost listen, then do thou raise thyself up like the sky, be inexhaustible as the sea."

3. "Inexhaustible shall be those that attend to thee, inexhaustible thy heaps ! They who give them as a present shall be inexhaustible ; they who eat thee shall be inexhaustible." [1]

Prayer for procuring increase of grain

1. "May the bounteous Nabhaspati preserve for us possessions without measure in our house."

2. "Do thou, O Nabhaspati ! keep strengthening food in our house. May prosperity and good come hither."

1 The Atharvaveda, Bk VI, Hymn 142.

3. "O bounteous God ! thou dost command thousandfold prosperity : of that do thou bestow upon us, in that may we share thee." [1]

This is addressed to Nabhaspati the Lord of the Cloud, so that he may be pleased to pour out rains and thus give a bumper harvest. A sacrifice with the same object called *Kāmeṣṭi* sacrifice is mentioned in the Vedānta Sūtra.[2]

Ploughing ceremony—

Ploughing is done on an auspicious day under the influence of the asterisms known as Jyeṣṭhā, Rohinī, Uttara, Prasthapadās, or Uttara phalgunyas. Before it is done, a Bāli offering is done at the eastern boundary of the field to heaven and earth ; and rice, curd, grains, perfumes and fried grains are offered to Indra, Parjanya, the two Aswins, the Maruts, Udatakāsyapa Svātikāri, Sītā and Anumati. The bullocks are then made to eat honey and ghee. When the plough is being put into motion, a Brāhmana touches the plough reciting the verse Ṛv. IV, 57, 8., and the front bullock is sprinkled with water, after which an unploughed ground is ploughed. Then oblations of cooked sacrifical food are offered to the same deities as above, after which follows feeding of the Brāhmans.

Gobila enjoins that sacrificial food should be offered to Indra, to the Maruts, to Parjanya,

1 *Ibid.* Hymn 79

2 The Vedānta Sūtra S. B. E vol. 38 p. 118 See also the Agnipurāṇa chap. CCLX.

to Asani, to Bhaga, to Sītā, Āsā, Aradā and Anaghā. Sacrifice is also to be made at the mole-hills to the King of moles.

The same deities receive offerings at the furrow sacrifice, at the threshing floor sacrifice, at the sowing, at the reaping of the crop and at the putting of the crop into the barn.

Sacrifice to Sita

The cultivator, whenever he sacrifices, be it on a field of rice or of barley, of that grain, he prepares a mess of cooked food. To the east or to the north of the field, a clean spot that has been ploughed is selected. The spot is smeared with cow-dung and sprinkled with water. The fire on which to cook the food is then established there, and round the fire is strewn *Darva* grass mixed with stalks of that sort of corn of which the sacrificial food is to be made.

Then oblations of the food are offered to Sītā, Yagā (the goddess of sacrifice), Samā (the goddess of zealous devotion) Bhuti (the goddess of welfare) with either mantras or with the word Svāhā only according to the Sruti, and on the kusa grass which is left over from the strewing (of grass round the fire), a Bāli offering is made to the protecting demons in the 4 quarters of the furrow.

The women of the house of the cultivator also, make accompanying oblations ; and when the ceremony is finished, the cultivator feeds the Brāhmaṇas.

Agrayana Ceremony (or Partaking of the first fruit)—

This sacrifice is to be performed in the month of Agrahāyana generally at full or new moon at the commencement of the harvest. The oblations which are prepared from new grains consist of,

1. a sacrificial cake contained on 12 potsherds for Indra and Agni,
2. a cake on one potsherd for heaven and earth and
3. a charu (or grains boiled in milk) for the Viswadevāh.

First, oblations of the milk-rice are offered to the deities ; and then the sacrificer sacrifices over those oblations Ājya oblations with the verses "to him who bears 100 weapons etc."

The rest of the remnants of the sacrificial food, is then given to all persons present who have received initiation ; and as for the sacrificer, he cuts off two portions of the boiled rice grains and over these portions, water is poured. After the food has been prepared this way, he swallows it without chewing it. Having sipped water, all present should then touch their mouths, their heads, their limbs from above downwards with the recitation of a certain verse.

In the same way, sacrifices of the first fruit are performed of Syāmāka and of barley.

Sulagava Sacrifice

In the fortnight of the increasing moons under an auspicious constellation, the sacrificer puts wood in the fire, strews *Darbha* grass on the

entire surface around the fire and cooks a mess of sacrificial food and milk. Then sprinkling the food with *Ājya*, takes it from the fire, builds two huts to the west of the fire, and an ox is led to the southerly hut with the recital of the following verse, "May the harmonious ones, bring thee hither, together with the white horses, the bright, wind-swift, strong ones that are as quick as thought. Come quickly to my offering *Sarva! Om!*"

Then, bounteous one (i. e. the consort of the ox) is led to the northerly hut, and the conqueror (i. e. the calf of these two parents) to the middle (between the two huts).

The sacrificer now gives them water to drink, in the same order in which they have been led to their places, prepares three messes of boiled rice and spreading Ājya on them touches the three beasts with those portions of rice in the order in which they have been led to their places with the mantras,

"May the bountiful one touch it. To the bountiful one Svāhā ! May she the bountiful one touch it. To the bountiful one Svāhā ! May the conqueror touch it. To the conqueror Svāhā !"

After performing certain oblations, he takes the messes of boiled rice to the fire, and sacrifices them, with the accompaniment of certain mantras to God Rudra and His Consort, and to Agni.

Then, around the cow, they place their cows so that they can smell the smell of that sacrifice. "With luck they may walk round out full face" with these words, he walks round the fire, the

three beast and the cows so as to turn his right side towards them and worships the Sulagava.

Now follows the distribution of *Palāsa* leaves at different places with certain formulas.

Then a basket of leaves is made and a lump of boiled rice is put into it. The sacrificer goes out to the pasture grounds and hangs the basket up at a tree with the formula 'Quiverred ones touch them. To the quiverred ones Svāhā!' and performs worship before the basket saying "Adoration to the quiverred one, to him who wears the quiver! To the lord of the theives, adoration."

With sandal, surā and water, fried grains and cow-dung, with a bunch of *Dūrvā* with *Udumbara, Palāsa, Vikankata* and with *Asvattha,* branches and with a cow-tail, he besprinkles his cows—the bull first with the words "Bring luck."

The sacrificer then cooks the sacrificial food sacred to *Kshetrapati* with milk, sprinkles it with *Ājya,* and performs a sacrifice to *Kshetrapati* on the path used by his cows.

Of the remains of that sacrificial food, sacred to Kshetrapati, his uterine relations eat or as is the custom of their family

Many other ceremonies in connection with agriculture or cattle such as 'Ploughing and sowing the site of a burial ground,' 'The Aśvayuga ceremony' 'The driving of the cow' etc are given in the Grhyasūtras and the Śatapatha Brāhmaṇa. They might be given here, if that would not mean an unnecessary increase in the volume of this work.

CHAPTER VIII.

GENERAL CONCLUSION:



Resume'

In olden days of India, the king had no property on the agricultural land. Only in return of his good government, he was entitled to a defined portion of the gross produce as tax ; and the tax was somewhat similar to our modern income tax. Agricultural laws, joint-family system and farming on large scales gave the necessary check to cultivators' indebtedness and also to an excessive sub-division of holdings; and fallow land instead of increasing as an evil consequence of sub-division of holdings, gradually decreased till for want of waste land which perhaps partly met the upkeep of the military, the king's demand came to be increased. The tax on land was ordinarily high. This fact presumably indicates further that indirect method of cultivating land, that is to say holding land as capital only which by the way, is largely in practice in modern times was practically unknown. We find Parāsara enjoining in his Krsi-saṃgraha to cultivate one's land by his ownself and discouraging supervision without taking an active part in cultivation.

From ancient days down to a long time after the Christian era, Vaisyas were in majority the actual tillers of the soil. Cattle lending, trade and banking were also in their hands; and they comprised a wealthy and respectable section of the people. Vox populi went strong till up to the end of the 3rd cent. B. C. The king then owed his power and position to popular suffrage and good will of his subjects. Truly, the epithet *Rājā* is derived from the fact of his pleasing (*Ranja* to please) the people. In cases of hereditary monarchy also, the popular sanction and approval was indispensable in the election of a successor. A notable instance of this is found in the Rāmāyana. King Dasaratha when wanted to give over the kingdom to his eldest son Rāma, thought it necessary to summon the popular assembly and obtain sanction to his nomination. In the time of the Buddha, we find the elective principle in force amongst the various Sākya clans. Jāt. No. 270 again, refers to election of king by votes. Such being the case and cultivators as a class being a good fraction of the total population, it is only reasonable to suppose that in all important matters, their opinion was invited and respected.

It was one of the important Regal duties to take a personal interest in agriculture and to see that there might be nothing detrimental to the interests of agriculture and agriculturists. From the evidence of Megasthenes we learn that agriculturists were regarded as sacred and inviolable. They were exempt from fighting and no restraint

that might distuib them in their peaceful persuits could be laid on them.

They were thus happy and contented but for famine which occasionally bioke out in parts of the country But the famine was seldom of a terrible character, neither was it frequently recurrent That was appaiently because produce was abundant and every village had usually a sufficient stock which could give at least a partial ielief if famine broke out. Forests weie open to the publ.c use, there was no insufficiency of fodder for the livestock by which the people always held a great store, neither was there any want of occupation because of the various prosperous manufacturing industries in ruial areas.

As for the agricultural mode, under the direct pationage of the king, it attained a striking perfection in ancient India. Irrigational methods were employed; and besides farmyard manure, various kinds of fertilisers bones, iaw beef, flesh of hogs and other animals were employed for manuring the field. Rice, wheat, barley, sesame, māsha, mudga and numerous other kinds of grains and also fodder crops were cultivated and all the items of agricultural operations were thoroughly understood. Most of the ancient agricultural methods and formulas are however, now forgotten. Only a few of them the Indian cultivator still possesses in the form of the popular maxims of Khanā Yet the system of agriculture that he persues, stands to favourable criticism of modern agiicultural expeits.

Last and not the least, the agriculturists were hospitable, good natured and god-fearing; and all their agricultural acts were ceremonial. Open religious discourses that were so characteristic a feature of ancient India, had always been a source of inspiration to the mass in olden days. In medieval times, such discourses took the form of *Kathalatā* and served as a popular mode of disseminating religious faiths and philosophic ideas in the form of stories and anecdotes, and was highly appreciated by the people In every village, it used to be held many times a year and men and women were very eager to attend it, and they heard it with awe and veneration. The Rāmāyana and the Mahābhārata were favourite subjects of Kathakatā. The great Epics wielded an abiding influence on the people who always tried to act up to the teachings and morals they drew from them It is a pity that such institutions are practically abolished at the present days. Boys and girls can yet hear the great stories and many others with religious stamp from their old grand-mothers who have ever since carried in their memory those sacred treasures with love and care. That is why, even to this day, a village cultivator who does not know so much as the alphabets, when questioned about even such things as soul and god, is heard to give a reply which only indirectly speaks of a great religious tradition of India.

The village was the home of the agriculturist. In Indian economic structure, the village

has always been the really important unit. This unit varied in size from one part of India to another, and the economic condition of the peasantry was not also perhaps exactly the same in all parts Modern conditions are however much different from what they were in general in ancient times when there was no external factors to throttle rural industries ; for agricultural economics is so largely dependent upon how the rural industries fare. Some deplore the present-day lack of communication to the remote Indian villages and consequent want of commercialisation of agricultural produce. But to say that commercialisation of raw produce is the only solution for betterment of the condition of cultivators, even though it is no more consistent with national protection, is too evidently fallacious and more so if no particular stress is laid on the introduction and encouragement of manufacturing industries in rural areas. Of course, isolation of villages is unhealthy. But in ancient India, ample evidences are there to prove that healthy communication existed between the different villages and districts. There was again, no ground for advocating encouragement of labour migration, for there was then no want of local employment throughout the year, for manufacturing industries did not centre round cities and towns only, but had much to do with rural areas, nor was there for obvious reasons such an abnormally heavy pressure on land as now.

The breed of cattle were fine. Now however,

bullock-power has come to an alarmingly low stage of deficiency.

Indeed with changes in political condition of the country, many knotty questions have now cropped up in agricultural economics. They however, do not concern this work. We shall now attempt to trace briefly the disappearence of Vaisya-agriculturists and close.

Disappearence of Vaisya-Agriculturists and the Condition of Modern Indian Cultivators

The king kept up the military probably by assigning portions of waste land to individual soldiers. As long as the waste land was in plenty, the king's share did not vary much. But, when later, there was no more waste land, the king's share increased at places to such a point that many cultivators had to give up their lands rather than cultivate them. Agricultural land thus partly passed on to rich magnets. Probably these purchasers and also the descendants of ancient nobles later held land as *Non-Bādsāhī* grants. The Mohamedan system of Farming-Revenue established a chain of middlemen of which the highest were the Farmers of Revenue and the lowest the headmen of villages, the obvious interest of all of whom was to squeeze out the cultivator to the utmost extent. The king's share greatly increased by imposition of cesses and taxes falling on land directly, and indirectly on ploughs, cattle etc. When the burden of taxation was beyond endurance, cultivators in a body refused to cultivate ;

but in such cases they were either intimitated or conciliated through the headman of the village. The natural defender of the cultivator thus became his great oppressor, and under the oppression, the peasant proprietors who still held land were all forced to give up their lands to the Farmers of Revenue who eventually came out as landlords holding land under the political authority of the king. The land was then leased out to the illiterate lowest classes who would suffer any amount of extortion. Those who obtained fixed tenure later, were either hereditary occupancy ryots of the Government or of the land-holders land in their own village The rights were generally non-transferable. The temporary tenants held land on a yearly lease, and tenure holders were a class of tenants holding land at favourable rates and cultivating them by hired labour. By this time, Vaisya cultivators had almost disappeared partly because of the fact that agriculture was not already for a long time an encouraging profession. They had consequently often been constrained to take to occupations not strictly allowable to them by the *Sāśtras* eventually causing their social degradation with the rise of the medieval orthodoxy with its vices. Since then, agriculture has been left in the hands of the lowest strata of population who have ever been incapable of understanding their situation and have been trodding on in their miserable path of life through oppression to a state of grinding poverty to-day.

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